Digitized by the Internet Archive
in 2014

https://archive.org/details/annualreportofne7219newy

THE NEW YORK ZOOLOGICAL SOCIETY
ANNUAL REPORT 1967

LIBRARY - NEW YORK
ZOOLOGICAL SOCIETY

SEVENTY-SECOND NEW YORK ZOOLOGICAL SOCIETY ANNUAL REPORT

1967

THE SOCIETY'S OFFICES
630 FIFTH AVENUE, NEW YORK 10020

THE ZOOLOGICAL PARK
BRONX PARK, BRONX 10460

THE AQUARIUM
CONEY ISLAND, BROOKLYN 11224

THE ZOOLOGICAL SOCIETY IN 1967

FAIRFIELD OSBORN, *President*

IT IS DIFFICULT for one who is in constant touch with the activities of our institution to maintain perspective and have a "long view" regarding current events. Each year, in turn, is marked in one way or another by its own characteristics.

The year 1967 was particularly notable because our ideas about the Society's future work and development were crystallized to the point of making even more evident certain objectives that must be reached. At the same time, the year was significant because it witnessed the culmination of many years of planning involving the Society's scientific activities. These prolonged efforts have resulted in the construction of the Osborn Laboratories of Marine Sciences and the creation of the new Institute for Research in Animal Behavior, a joint enterprise of the Society and the Rockefeller University.

As for clarification of future plans, the need for nothing less than major and far-reaching improvements of installations at the Zoological Park, whether in exhibition buildings or outside areas, has become more obvious than ever before. It is true that a number of improvements have been made during recent years, the first of which was the "African Plains," built more than 20 years ago — an exhibit area which adopted the idea of exhibiting animals according to their continental origins. Lately the brilliant success of the new Aquatic Birds House has further dramatized the gulf between the methods desirable today and those that are traditional and even archaic.

It is imperative that all animals live in environments as similar as possible to those in which the animals exist in the wild. This forward-looking program is essential for two major reasons — the enjoyment and educational values to be gained by the public and the welfare of the captive animals in our custody.

A major consequence of this vital program is the obvious need for financial resources to carry out these ideas. The ultimate goal calls for a further and thoroughgoing transformation of much of the Zoo. Reaching the goal will take many years — even a decade or more. For instance, a number of our present large buildings, though pleasing from an architectural point of view, are unadaptable to the standards that must now be adopted. Those buildings that are not convertible must be put to other uses or else be demolished and new structures erected in their places. A typical case is that of the present Lion House, now containing an impressive collection of the great felines of the world — Siberian and other tigers, cheetahs, jaguars, leopards, lions, and pumas.

Most, if not all of these species, can be far more suitably as well as dramatically exhibited in environments which cannot be installed in the present building. Another example is the old Antelope House, built in 1903, which contains such superb representative ungulates as giraffes, okapis, and various species of antelopes. Our future development program, already largely planned, provides for a panorama of many of these great animals of Africa. As a result, this old building will be closed to public use and converted into winter holding quarters for those animals which cannot tolerate winter conditions in this latitude.

Fortunately, the Aquarium, still in its formative stage, will not meet with the same problems inherent in carrying out the plans for the Zoological Park. The development program of the Aquarium will adopt the latest techniques in order to make it a truly outstanding center for the exhibit of the aquatic life of the world.

Seven years ago, at the Annual Members' Meeting, the President's report contained this statement: "Our purpose is not to get 'bigger and bigger' but 'better and better'!" Although this was deliberately so expressed, it is possible that its meaning could be somewhat misunderstood and consequently calls for comment here. To bring our two public institutions – the Zoological Park and the Aquarium – to the high standards we must maintain, a somewhat larger staff and increased operating costs will be involved. In this sense our organization will actually need to be larger and will, as well, involve greater costs of operations. The key intention of the statement quoted above was to make clear that the Society does *not* intend to enlarge the scope of its purposes. These are clearly defined in the Society's Charter established in 1895. This provides that the Society "shall . . . establish, maintain and control zoological parks, gardens, or other collections for the promotion of zoology and kindred subjects, for the instruction and recreation of the people. Said corporation may collect, hold and expend funds for zoological research and publication, for the protection of wild animal life, and for kindred purposes. . . ."

Detailed reports dealing with the year's activities and elaborating on several of the summary statements made above will be found successively in the reports by the General Director, the Directors of the Aquarium, Osborn Laboratories of Marine Sciences, and the Institute for Research in Animal Behavior. These latter reports will be followed by the reports of the heads of the various other departments of the Society, and, finally, with the year's financial statements.

WILDLIFE PROTECTION

Work in this field is, as noted, one of the Society's chartered purposes. At the present time its importance is greater than at any previous period in the Society's history, due to the world-wide crisis that now acutely threatens the survival of many species of animals.

The Society maintains two funds, both of which depend upon gifts from individuals, private foundations, and governmental agencies. The major fund is identified as the "Conservation Fund," part of whose expendable assets are derived from income from earlier gifts or legacies donated for this purpose. It is the Society's practice to expend the available monies in this fund for wildlife protection in any part of the world. Grants made during the year were:

United States

Protection of Predators

Survey by Dr. L. D. Frenzel, Macalester College, Minnesota, of wolf-deer relations in Minnesota, where apparently the wolf population is "holding its own"; descriptions of predatory techniques of wolves on deer, to learn whether wolves are selecting old, sick, and young deer as they are other species; estimates of wolf density; and observations of intraspecific tolerance. $3,500

Continuation of mountain lion field studies by Maurice Hornocker, University of Idaho. $1,000

Study of ecological comparisons of social organization in American bison, by Professor W. N. Holsworth, University of Western Ontario, Canada. $2,700

Trinidad

Funds for purchase of equipment (boat, trailer, binoculars) to aid in protection of fauna of Caroni Reserve — Forestry Department of Trinidad. $2,210

Aid in purchase of Asa Wright Nature Center in Trinidad for establishment of permanent Nature Reserve, in cooperation with the Florida Audubon Society. $5,000

Galapagos Islands

Charles Darwin Research Station on Galapagos Island — for services of conservation officer, 1967–69. $10,500

Bermuda

Bermuda Audubon Society — for continuation of Bermuda cahow study by David Wingate — to save an extremely rare bird. $3,000

Miscellaneous

Fauna Preservation Society of London — contribution for resuscitation of sea birds injured at Cornwall, England, due to sinking of oil tanker *Torrey Canyon.* $560

Boy Scouts of America – continuing support of Hornaday Award Program.	$250

Additionally, the Society holds a fund entitled the "African Wildlife Fund," which, as its name indicates, focuses on problems on that continent. Expenditures from the fund during the current year are:

Bridge over Mara River, Ministry of Tourism and Wildlife in Kenya, to control poaching in a region rich in wildlife.	$22,000
Field study by John Goddard of black rhinoceros in Tsavo National Park, Kenya, payable through East African Wildlife Society.	$4,200
Field study by Iain Douglas-Hamilton on elephant population in Lake Manyara National Park, payable through Tanzania National Parks.	$6,550
Aircraft and radio equipment to aid control of poaching in the Uganda National Parks.	$1,500

In the last two years, the Society has been engaged in negotiations with the Kenya government for the inclusion of the Amboseli region within the Kenya National Parks system. This region, lying at the northern base of Mount Kilimanjaro, the highest mountain in Africa, is fed by perpetual waters stemming from the snowfields from the mountain above, with the consequence that there normally exists in Amboseli an extraordinary concentration of mammalian and avian fauna.

Asia and Africa

In 1965 the Society arranged for a two-day conference concerning the heavy drain by a number of medical centers in this country upon primate populations in both Asia and Africa. The large importation of primates by medical centers for experimental purposes poses a serious question which in some way must be resolved. The Society is now arranging a second conference to be held during the coming year to determine how to deal with this serious problem.

Scientific Activities

Osborn Laboratories of Marine Sciences

The dedication of the Osborn Laboratories of Marine Sciences, adjacent to the Aquarium, took place on September 28. Dr. J. George Harrar, President of the Rockefeller Foundation, made the dedicatory address. In addition to his encouraging statements concerning the importance of the new Laboratories, he expressed a strong warning that the resources of the world's oceans are being threatened by a degradation similar in many respects to the destruction of terrestrial natural resources.

The variety of sources that have made possible the construction and operation of these new Laboratories have been extremely heartening. Governmental agencies, such as the National Science Foundation of the federal government and the Health Research Council of the City of New York, made substantial grants. Other support was received from independent foundations, including the Rockefeller Foundation, the New York Foundation, and the Scaife Family Fund. Scientific research has previously been carried on in totally inadequate facilities. The new Laboratories are proving an outstanding center for the advancement of marine science.

A report revealing the wide financial support being received from outside sources has just been prepared by Dr. Ross F. Nigrelli, Director of the Laboratories. This support has been derived, in the main, from governmental agencies and independent foundations – grants over the last five years totaled $1,445,000.

Institute for Research in Animal Behavior

The recently created Institute for Research in Animal Behavior, a joint enterprise of the Zoological Society and Rockefeller University, now has gathered a staff of high scientific competence under the directorship of Dr. Donald R. Griffin, previously Chairman of the Department of Biology of Harvard University, and Dr. Peter Marler, Senior Research Zoologist, formerly Professor of Zoology at the University of California. Dr. Griffin recently stated:

> One of the youngest but most rapidly growing areas in modern biology is animal behavior. Why animals and men behave as they do has now become a question amenable to scientific investigation and no longer remains in the exclusive realm of vitalism and religious dogma. The study of animal behavior has become a sector of biology where many distinguished scientists expect major "breakthroughs."

The William Beebe Tropical Research Department is being administered by the Institute, although its identity with its founder, the late Dr. William Beebe, will be retained.

During the short existence of the Institute, support from governmental and private foundations has totaled $251,350. As this report goes to press additional grants from governmental sources are anticipated, all of which is highly encouraging.

FINANCES

A fund campaign, the first of its kind in the Society's history, was launched in 1961. It had as its original goal $7,000,000. The contributions of individual members of our Board of Trustees laid the foundation for the ultimate success of this campaign. Collectively, gifts from trustees represent more than one-quarter of the entire amount raised. Other contributions and grants were received from many different sources, including governmental agencies, a number of independent foundations, members of the Society, and other individual donors. Because of the receipt of an extraordinarily generous legacy from the estate of a former member, the late Elmer C. Otto, amounting to more than $1,800,000, this phase of a long-term campaign has terminated this year with total receipts of $9,014,857.77. The proceeds of the Elmer C. Otto bequest have been placed in invested capital account.

A large proportion of the new funds are now being expended for physical improvement at both the Zoological Park and the Aquarium. It is expected that two of these, The World of Darkness, and exhibits for polar and Kodiak bears – both at the Zoo – will be opened to the public during the coming year, followed by the start of construction of the new and extensive exhibit to be entitled The World of Birds. At the same time a series of relatively minor but attractive new exhibits are being installed at the Aquarium. Substantial amounts of additional funds are now required to carry out the plans for the future being developed.

Rapidly increasing administrative and operating costs represent a problem common to all cultural institutions in New York City. As is well known, this problem represents a crucial dilemma at this time to institutions such as universities, colleges, hospitals, and a host of other independent agencies, indispensable to American life and welfare. All are attempting to deal with the situation in somewhat different ways but the net result is that all are in urgent need of far greater financial resources. The point is that the Society is far from being alone in facing this difficulty. Above all, the Society is determined to maintain itself in a sound economic status.

The Society, from its own income, has financed during the current year total operating expenditures in the amount of $1,106,200, which compares with approximately $524,000 in 1960.

The existing drain upon the Society's finances in providing the funds to support the Zoological Park's operations emphasizes the need to obtain a revision of the Society's Charter by the New York State Legislature – a revision that will permit the Society (subject to the approval of the Department of Parks) to establish a level of admission fees and to increase the number of days on which these fees be required. This Charter revision will be of great aid in meeting the ever mounting costs of improvements at the Zoological Park. Most major zoos, as well as other similar institutions both in the United States and in Europe, charge admissions, which go a long way to help them meet the costs of development.

Because of the financial problems indicated in all of the above, the Board of Trustees, at its December meeting, unanimously voted to launch during the coming year a second phase of the fund campaign, whose goal will be approximately the same as that launched in 1961. An announcement describing the reasons why these new funds are required and the purposes for which they will be expended, as well as the aggregate amount to be sought, will be made during the coming year.

TRUSTEES AND STAFF

Howard Phipps, Jr., was elected Secretary of the Society at the meeting of the Board of Trustees on December 13. He will succeed John Elliott, who served for a number of years as Secretary as well as an ex officio member of the Executive Committee. Mr. Phipps will also succeed Mr. Elliott as a member of that committee.

Charles W. Nichols, Jr., has been elected to membership on the Executive Committee.

John Pierrepont has been appointed a member of the Finance Committee.

The year was saddened by the death of John Tee-Van, General Director Emeritus of the Zoological Park and Aquarium, who had ably and devotedly served the Society in various capacities for a period of 51 years. A memorial article concerning him will be published in the February 1968 issue of *Animal Kingdom,* the Society's popular publication.

MEMBERSHIP

At the close of the year our membership totaled 6,717 – the highest number in the Society's history. Membership approximately doubles that of ten years ago.

Membership is neither maintained nor increased automatically. Statistics prepared fairly recently indicate that every membership institution similar to ours has an average annual dropout of more than 10 per cent of the total membership. Our Society's annual loss has been somewhat less than the average.

It has never been our policy to engage outside professional help to gain membership, our view being that although this might result in sporadic growth of membership, it would not be continuously maintained and, further, could not be done without considerable expense. Our membership activities are carried on by members of our staff who, at the same time, have other administrative responsibilities. Therefore the costs of member maintenance and growth are relatively small.

The basic strength of our institution depends to a very large extent on the belief that our members hold in the unique values of the Society and its work, and, in turn, the financial support that our members, both individually and collectively, are prepared to give. As far as special gifts are concerned, attention should be called to the fact that contributions to the Society are deductible for income tax purposes to an amount equal to 30 per cent of adjusted gross income. Additionally, bequests to our Society are not subject to estate taxes.

There are no visible limits to what the Society can accomplish in the future in advancing its purposes, whether through services to the public in recreation and education, or in advancing knowledge concerning animal life, or, finally, through wildlife protection and scientific research.

THE ZOOLOGICAL PARK

GENERAL DIRECTOR'S REPORT AND REPORT OF THE ZOOLOGICAL PARK

WILLIAM G. CONWAY

WILD ANIMALS come to the Zoo in many ways. Sometimes local creatures literally fly in, like the mallards and shovelers that drop in to the Zoo's exhibit ponds during the winter months; at other times they are carried in, usually by two or three disheveled little boys who have rescued them from some mishap. But the great majority of Zoo animals are added to the collection through captive breeding or by purchase from animal dealers. And it is this latter method that especially concerns us, for buying animals regularly brings us into contact with the trade in wild animal pets.

While zoos and, more often, aquariums occasionally dispatch their own collectors or curators to acquire animals in the wild, most captured specimens are obtained from commercial dealers, many of whom supply exotic animals for the pet trade. Some animal dealers, particularly those who deal only with zoos and aquariums, have an abiding interest in wild creatures and their welfare. More frequently, however, dealers are unable to distinguish one species from another, much less to adequately care for their animal charges. Those dealers whose interest is such that their concern for an endangered animal overbalances their desire for a good sale are in themselves rare, very rare.

During the past year, the pet buyer in New York City has been deluged with offerings of such relatively common creatures as squirrel monkeys. Occasionally he also has had the chance to buy very delicate primates — titis and howler monkeys, for example. Bornean flying lizards, South American cock-of-the-rocks, golden-headed quetzals, fairy bluebirds, barbets, rare turtles, frogs, crocodilians, and even snakes have been available — many in disturbing numbers. And pet stores are not the only vendors of these delicate creatures. Department stores and shopping centers have found the exotic-pet trade profitable. Woebegone little spider monkeys, turtles, and spectacled caimans vie with endangered Berlandier's tortoises and tropical finches for the attention of shoppers. It is remarkable that relatively rare and expensive creatures like Central American parrots and precariously delicate ones such as three-toed sloths — even a tree pangolin — can be offered in an unregulated way to the unsuspecting public; and it is disgusting.

Most of these animals will die from lack of care within weeks if not days. Many that live longer will do so despite the kind of care they receive rather than because of it. When a wild animal is collected for the pet or laboratory trade, it is dead insofar as its value to *its* species is concerned – unless it is to be used for breeding, study, or wildlife education.

The value of a wild animal pet to the owner, however, can be a substantial one; the excitement and stimulation provided, especially to children, by the opportunity to keep interesting creatures cannot be denied, nor should it. Besides, most wild animal populations can withstand well-managed collecting. At the same time, however, endangered species cannot, and animals too delicate and too specialized to be personal pets must not be sold as such. Wild animals doomed to die promptly as pets make little contribution in any area.

It is as revealing as it is immoral that creatures such as horned lizards continue to be as popular in the pet trade today as they were thirty years ago – despite the fact that they have exceptionally specialized feeding and temperature requirements and almost invariably starve to death after a few weeks in captivity. Surely pet dealers are aware of this; they must also know that not even zoos have successfully maintained three-toed sloths and flying lizards. Could it be that knowledgeable animal dealers really believe that golden-headed quetzals and hummingbirds will make suitable house pets? Is it possible that a man qualified to sell living creatures could not know of the endangered status of the giant Galapagos tortoises, orangutans, or even of Berlandier's tortoise? Is it conceivable that people whose care of dogs and cats is watched over by innumerable societies and regulations should be allowed to starve and mistreat delicate wild creatures?

Some of the problem, of course, lies with the foreign exporter. Most wild animals are being exported from developing nations. The primary collector in these nations is often an uneducated individual with no understanding of the principles of wild animal care and no concern for wildlife protection. These native collectors sell their catch to exporters who usually know little more than they do – and the results are predictably tragic. If a specialized sensitive wild creature is fortunate enough to survive initial collecting and acclimatization, then the animal is usually shipped abroad (although there are also substantial pet markets in many undeveloped countries).

If there were no foreign markets for unsuitable wild animal pets, this tragedy of cruelty and indifference would not be initiated in the newer nations.

Lack of understanding and the urge to cut costs often lead the shipper to inadequately pack his wild cargo. Animals die of thirst, starvation, cold, fighting, and overcrowding. The total number of small birds lost in overcrowded shipments, because some airline hand has left the shipping crate in a cold place, or through lack of water may run into the hundreds. It is true that some species are characteristically hardy during shipping, but many are notoriously delicate. By the time an incompetent collector has occasioned untold animal deaths and sold the survivors to an incompetent exporter, who passes the further reduced survivors to an incompetent importer, to an incompetent pet dealer, no one can say how many animals have died to provide one unsuitable pet to some unsuspecting and probably incompetent pet owner.

Fortunately, bona fide zoos contribute little to this trade. They conduct no terminal experiments and are breeding animals in increasing numbers. The world's 500-plus zoos contain only about 500,000 vertebrates, and their annual importation of specimens is small and specialized. Animal importation for zoos is, nevertheless, an important trade in terms of endangered species and should not be exempted from scrutiny. It has contributed in no small measure to the precarious status of two species, the orangutan and the monkey-eating eagle. Today, thanks to self-regulation, the threat from the zoo trade is no longer very significant in the future of these creatures; in fact, zoos have become so aware of the need to protect wild species that the growing significance of zoos as nuclei of conservation programs and education is readily apparent. Needless to say, the zoo-aquarium position as the urban man's only contact with wild creatures is of great potential importance to the future of all wildlife.

Unfortunately, medical and pharmaceutical research also increase the drain on wild animal populations. This demand is particularly centered on primate populations (see Conway, "The Availability and Long-Term Supply of Primates for Medical Research," *International Zoo Yearbook,* 6, 284–288), so much so that it threatens the resource itself. In 1967, 62,526 wild primates were imported into the United States – mostly for laboratories. And unlike zoos, most laboratories breed very few wild animals. Recently, losses in transport if not in collecting have been reduced through the institution of thoughtful reforms. However, many medical researchers have little idea of the nature and relationships of their wild subjects. The use of animals more specialized than the usual laboratory creatures must be thoroughly justified in each case.

If only a few animals were involved, perhaps this deplorable situation could be overlooked; certainly it could more easily be controlled. Considering all these aspects, the trade in living wild creatures has become a huge business, especially since the advent of the airplane and the penetration of almost every wild frontier.

The scope of the threat to the wildlife of even a single nation through annual export is evident from the following figures (provided by Mr. Ian Grimwood) for 1964 from Peru. A total of 39,522 live animals was exported. Of these, 26,226 were squirrel monkeys, almost all of them for research and the pet trade; 6,325 were other small monkeys sold chiefly as pets. Figures for United States imports in the first 10 months of 1967 include 74,304 mammals, 203,189 birds, 405,134 reptiles, 137,697 amphibians, and 27,759,332 fish. None of the reptiles and few of the remainder of these imports are captive bred.

Unhappily, the figures for the importation of living animals are but a fraction of the animal lives represented in the annual trade in animal skins and hides. In 1964, for example, Peru exported 11,244 ocelot skins but only 174 live ocelots. Total skins and hides exported were 247,956. Habitat despoiliation, hunting, and the trade in skins and hides are so significant in the destruction and use of wild creatures by man that they overshadow the trade in living animals; the live animal trade amounts to an insignificant fraction of one percent of the overall annual extermination of living things by man, but the unnecessary animal suffering and waste inherent in the living trade represent a situation that cannot be ignored.

Examples of wild animals suitable as pets are few, beyond the eminently appropriate domestic canaries, budgerigars, hamsters, and certain tropical fish. With proper regulation of the pet trade and the restriction of collecting and exporting to trained specialists, the list could be greatly lengthened. Some of the frogs and such lizards as common iguanas may be suitable. Many insects and spiders, particularly those that the child can collect himself, make fascinating and instructive pets. Finches, if properly shipped and cared for, can be added to the list, for many come from large populations that reproduce rapidly. Introduced birds, such as starlings and house sparrows, that verge on the "pest" classification, are also appropriate subjects for the pet trade and these could be trapped where they are not native. Some of the more exotic introduced birds, for example, could make desirable pets. Interestingly, one of the side effects of the poorly managed pet business has been the introduction of a number of potential pests through escapes. Nearly 60 kinds of animal have been introduced accidentally in Florida this way. One, a bulbul, promises to become a pest of orange trees. Even our native redwing blackbirds, the subject of pest-control programs in some states, are more practical pets than quetzals! If better managed by more able people, the pet trade could take advantage of agricultural pest-control programs in various countries. In Argentina, for example, the attractive and interesting monk parakeet and the burrowing parrot are the subject of extermination campaigns and might be legitimate subjects for the pet trade, while in Sierra Leone one of the guenons has become the subject of government control programs; nearly 25,000 were killed a few years ago. This animal could replace some of the monkeys less suitable to the pet trade. However, monkeys — one and all — are not suitable as household pets, the successes of rare individuals notwithstanding. For people with space at their disposal, the maintenance of pheasant, dove, and waterfowl collections, usually derived solely from the propagation of captive stocks, makes an exciting and productive avocation.

The productivity of some kinds of properly managed wildlife is remarkable, particularly temperate climate species. For example, the 1965 United States hunting harvest of mourning dove is calculated at 41.9 million. In the same year, the woodcock kill was estimated at 900,000, the snipe kill at 387,000, while 20,000,000 waterfowl of various species were shot in the 1965–1966 season.

Unfortunately, many, perhaps most, of the tropical species now being imported for laboratory and pet uses have limited habitats and relatively small populations, compared to some temperate climate species.

However, under humane, thoughtful regulations and advanced wildlife management provisions, some exotic animals could come to the pet market — accompanied by thorough instructions on their care — without endangering the wild populations. Through the interest these animals would create, they would act as representatives of all wild creatures and wild places, thereby stimulating public feeling for the protection of their wild relatives. But if proper management cannot be instituted, the trade must be stopped.

New Developments

Not since the Zoo opened has there been so much construction and reconstruction underway upon the grounds at one time.

Facilities for the Institute for Research in Animal Behavior were greatly enlarged with the construction of a second floor and new offices in the Bay Tree House and the redevelopment of a large greenhouse as a superb series of aviaries.

Early last spring an attractive, convenient staff dining room was opened. Constructed as a wing of the Cafeteria, it has already proven a boon, providing a regular meeting room for operational meetings, a place to entertain official guests, and an informal atmosphere where the staff can exchange information and ideas. Later in the year, the Department of Education was moved in its entirety from its suite of offices in the Administration Building to more spacious quarters adjacent to the recently renovated auditorium at the Heads and Horns Building. This newly developed area includes a small projection room, storage area, offices, and film editing room, as well as a sound-recording facility.

Meanwhile, construction proceeded on the Lake Agassiz Bison Range, the Kodiak and Polar Bear Exhibits, and the World of Darkness. Work on this last project has moved at a snail's pace.

Two reconstruction projects were also initiated at the Pheasant Aviary and the Eagles and Vultures Aviary. Behind the scenes, the basement of the Lion House has been redeveloped as a mammal acclimatization and management research area. Now provided with a modern kitchen, excellent lighting, new walls, and a variety of animal holding cages, this revitalized area will greatly enhance the care of the collection. Still another major behind-the-scenes development has been the improvement of the Yak House. Growing antelope herds made the need for a practical wintering facility mandatory. The redevelopment of this old structure has temporarily filled the need, and a carefully planned series of 22 stalls has been constructed within the structure. Many other physical improvements were effected during the year, and they are recorded in the departmental reports.

In July an important training program for potential curators was instituted by the Society. This program, first of its kind in the United States, was initiated with the appointment of three young zoologists to work in the mammal and bird departments for a period up to three years. The program is so arranged that the trainees work directly with the curators, assisting them on a project basis and gaining firsthand experience of all aspects of zoo animal management and exhibition. The dearth of qualified personnel for the small and specialized zoological park field is such that important zoo positions scattered about the nation often remain unfilled for long periods. The new program should develop a cadre of qualified people, not only to fill positions at our Zoo but also to generally improve the profession.

During the year Mr. Conway was President of the American Association of Zoological Parks and Aquariums, an honor that was demanding but valuable. He continued as a member of the Survival Service Commission, attended its October meetings in Switzerland, and served as a member of the Board of the National Audubon Society. He continued to act as a member of the Advisory Board of the *International Zoo Yearbook* and participated in a variety of other activities having mainly to do with wildlife protection. In late October and early November, the General Director attended the meetings of the International Union of Directors of Zoological Gardens and visited zoos in Barcelona, West and East Berlin, Frankfurt, and Cologne. Publications and papers included "The Opportunity for Zoos to Save Vanishing Species," *Oryx,* IX (2), 154–160; "U.S. Zoos Feature Many Wild Animals Bred in Captivity," *The World Almanac* 1968; "How to Exhibit a Bullfrog, A Bedtime Story for Zoo Men," AAZPA 1967 Annual

Conference; and, with Trustee Robert G. Goelet, *From the Pampas to Patagonia,* a 45-minute sound and color movie on Argentine wildlife, with a strong conservation message.

SUMMARY OF ATTENDANCE

	Park Attendance		*Aquarium Attendance*	
	1967	*1966*	*1967*	*1966*
January	63,500	27,745	19,015	7,241
February	49,211	63,299	16,425	15,766
March	128,786	91,146	26,468	18,812
April	277,652	258,759	32,538	34,844
May	324,625	391,483	35,729	39,163
June	328,933	340,746	37,927	40,291
July	394,125	392,605	60,160	57,277
August	323,575	372,928	62,600	63,770
September	234,497	214,508	32,170	26,602
October	192,974	198,938	27,175	25,058
November	87,910	114,689	24,419	22,919
December	28,077	40,016	11,741	12,371
	2,433,865	2,506,862	386,367	364,114

ZOOLOGICAL PARK COMBINED CENSUS

December 31, 1967

	Species & Subspecies	*Specimens*
Mammals	203	842
Birds	551	1,898
Amphibians and Reptiles	253	535
Totals	1,007	3,275

DEPARTMENT OF MAMMALOGY

HUGH B. HOUSE, *Associate Curator*

GRACE DAVALL, *Assistant Curator*

JOSEPH RUF, *Animal Manager*

JAMES DOHERTY, *Mammalogist*

DAVID NELLIS, *Mammalogist*

LEE S. CRANDALL, *General Curator Emeritus*

THE MAMMAL DEPARTMENT census at the end of the year showed 842 specimens of 203 species and subspecies. Both figures are increases over last year. The number of families and orders also increased to 54 and 15, respectively. The addition of two training positions, filled by Zoologists James Doherty and David Nellis, has greatly increased the Department's ability to expand its activities.

THE COLLECTION

"U Mishmi," the young male takin acquired in 1966 as a prospective mate for "Gracie," our female takin, has grown remarkably and has developed a truly impressive set of horns.

A trio of active and thoroughly entertaining polar bear cubs was acquired for the new Bear Dens, which will be ready in 1968.

During July and August, 76 bats of six species were acquired as a result of collections made locally and in Brazil by Mammal Department staff members. The new bats brought the total species to 11 and gave us an extremely interesting sampling of this varied and fascinating order of mammals. Included is the seldom-seen fisherman bat. Subsequent to the collections, staff members and keepers have been working out the highly specialized problems of diet and exhibition technique.

Significant losses during the year included the old male okapi "Bilota," who was a mature animal when he arrived in 1949 from the Congo. He lived here for 17 years, eight months and eight days. Our male jaguar "Juan," another old-timer with a known longevity of 17 years and 24 days was also lost. He was zoo-born in Cleveland and his litter mate, "Juanita," is still with us. The pair had bred here and their last litter of three, born in 1958, achieved television fame both here and at the Crandon Park Zoo in Miami, where the young animals were eventually sent.

FORMS NEW TO THE COLLECTION ACQUIRED IN 1967

Bulldog bat – *Noctilio labialis albiventris* Desmarest
Fisherman bat – *Noctilio leporinus rufipes* D'Orbigny
Greater artibeus fruit bat – *Artibeus lituratus lituratus* (Oefers)
Pallid bat – *Antrozous pallidus pacificus* Merriam
Vesper mouse – *Calomys callosus boliviae* (Rengger)
Cane rat – *Zygodontomys brevicauda* (Allen & Chapman)
Long-eared or gerbil mouse – *Malocothrix typica* Smith
Indian common otter – *Lutra lutra nair* F. Cuvier
Black-footed cat – *Felis nigripes* Burchell
Steppe cat – *Felis libyca caudata* (Gray)
Red brocket – *Mazama americana* (Erxleben)

THE BREEDING PROGRAM

Forty-seven species of mammals bred in the Zoological Park during 1967, producing 144 offspring. Among the antelope were four Jackson hartebeests, 12 Thomson gazelles, two Maxwell duikers, two black-backed duikers, one gray duiker, one white-tailed gnu, eight nyalas, two blesboks, two gemsboks, and one blackbuck. We now have relatively large breeding herds of several rare species, a situation which creates a continuing space problem.

The birth of a Grevy zebra foal on August 2 was a particularly welcome event. Only two of these zebras had been bred here previously, one in 1950 and another in 1953. The new foal is a female.

Two male snow leopard cubs, "Sherpa" and "Shadow," born in 1966, have developed into fine animals. "Shadow" was exchanged for a male Siberian tiger from the Assiniboine Zoo in Winnipeg, Canada. We acquired a wild-caught female cub as a mate for "Sherpa." Both pairs are completely compatible and hopefully will prove to be breeders of this rare and important species.

Last spring a proven breeding female snow leopard from the Oklahoma City Zoo was sent here to be bred to our male, after the tragic death of Oklahoma City's only male. Not having adequate maternity facilities here after she had been bred, the female was sent back to Oklahoma City. In July she gave birth to and subsequently reared two fine cubs.

The tiger received from the Assiniboine Zoo was an exceptionally good cub, which again benefits our breeding program of yet another endangered species. The Siberian tigress received here in 1962 has reared three cubs this year and has proven to be a model mother.

Our white-handed gibbon family was installed on Gibbon Island on June 9, and on June 26 the female gave birth to her 12th youngster since 1942.

Two douroucoulis presented their second baby on March 30. Their first youngster, born in 1966, remains with the group. Breeding of this species in captivity is a rare occurrence.

Two ring-tailed lemur young that arrived during the year represented the first births for the species here since 1912.

In an effort to establish breeding groups of large Malayan mouse deer elsewhere in the country, pairs were sent to the zoos in Buffalo and Philadelphia.

PHYSICAL IMPROVEMENTS

Development of a vital nonexhibit holding and observation area in the Lion House basement provides more adequate facilities for necessary extra male animals, breeding groups, and specimens undergoing therapy or quarantine, as well as accommodations for outdoor exhibits that must be moved indoors in the winter. It also offers possibilities for improving diets, housing, and exhibition techniques.

A renovation of the holding areas in the Wolf Wood, as well as improved water supply and drainage, greatly improves the operation of this unit.

Demolition of the old Bear Dens began in April, followed by the start of construction of the new dens, which hopefully will be operable in 1968.

After months of work by outside contractors and our own construction force, a completely renovated Yak House now provides much needed additional facilities for our growing herds of antelope. Originally built in 1913 and used for many years mostly as a storage unit, the interior of the building was completely redone. It now comprises 24 stalls, with connecting doors and some with outside yards.

The acquisition of several large colonies of bats for ultimate exhibition in the new World of Darkness necessitated finding space for special temporary accommodations in the Small Mammal House and the Monkey House and Lion House basements.

Other Activities

Mr. House attended the Pan-American conference of the American Association of Zoological Parks and Aquariums in Mexico City in March and the regular annual meeting of the Association in Tampa, Florida, in December. At the latter meeting, he presented a paper entitled "A Preliminary Report on the Genetic Problems Attending Long-Term Exhibition of Ungulates." He visited the Chapultepec and the Aragon zoos in Mexico City, the Arizona-Sonora Desert Museum in Tucson, as well as zoos in San Diego, Houston, and San Antonio en route home from the meetings. Field trips to collect bats were made to Brazil, West Virginia, Pennsylvania, and New Jersey. Zoologists Doherty and Nellis also collected in West Virginia and Pennsylvania and visited the National Zoological Park in Washington, D.C.

Research

Thomas Wolski, summer research student from Cornell University, together with Mr. House, studied the literature and our own records for data concerning inbreeding in hoofed stock. Robert Klein, also in the Cornell summer research program, worked with Mr. Nellis investigating problems in bat diets and exhibition.

CENSUS OF MAMMALS
December 31, 1967

Orders		Families	Species and Subspecies	Specimens
MARSUPIALIA	kangaroos, phalangers, opossums, etc.	3	9	16
INSECTIVORA	moles, shrews, hedgehogs, etc.	2	4	14
CHIROPTERA	bats	4	11	91
PRIMATES	apes, monkeys, lemurs, marmosets, etc.	6	35	116
EDENTATA	armadillos, sloths, anteaters	3	5	7
PHOLIDATA	pangolins	1	1	1
LAGOMORPHA	pikas, rabbits, hares	1	1	3
RODENTIA	squirrels, beavers, mice, porcupines, etc.	13	31	117
CARNIVORA	bears, raccoons, cats, dogs, otters, etc.	7	52	124
PINNIPEDIA	seals, sea lions, walruses	2	3	3
TUBULIDENTATA	aardvarks	1	1	1
PROBOSCIDEA	elephants	1	3	4
HYRACOIDEA	hyrax	1	1	1
PERISSODACTYLA	horses, tapirs, rhinoceroses	2	3	8
ARTIODACTYLA	cattle, sheep, antelopes, camels, giraffes, deer, swine, hippopotamuses	7	43	336
	TOTALS	54	203	842

Summary: orders, 15; families, 54; species and subspecies, 203; specimens, 842.

DEPARTMENT OF ORNITHOLOGY

William G. Conway, *Curator*

Joseph Bell, *Associate Curator*

Grace Davall, *Assistant Curator*

Andrew Winnegar, *Animal Manager*

Donald Bruning, *Ornithologist*

Lee S. Crandall, *General Curator Emeritus*

THE SOCIETY'S bird collection included 640 species and subspecies and 1,898 specimens at the close of 1967. Twenty-five orders and 87 families were represented. Waterfowl are a major portion of the collection, with 500 specimens of 99 forms at the year's end. The Department's staff was increased by the addition of Zoologist Donald Bruning in a training position.

THE COLLECTION

Major renovation of two of the department's older exhibits, the Pheasant Aviary and the Eagle Aviary, was initiated, making it necessary to reduce numbers and species in these sections of our collection. However, there were several acquisitions during the year that deserve special mention. Six young Darwin's rheas that arrived in May are a step forward in our program of trying to establish breeding groups of large, flightless birds. Six white-necked picathartes, a rarely kept West African species first exhibited here in 1959, were acquired with the same hope in mind. Also worthy of mention were two North Island weka rails and two curlew sandpipers. The most serious loss of the year was a harpy eagle, in the collection since 1944. This may well represent a longevity record for this species in captivity.

FORMS NEW TO THE COLLECTION ACQUIRED IN 1967

North Island weka rail — *Gallirallus australis greyi* (Buller)
Curlew sandpiper — *Erolia ferruginea* (Pontoppidan)
Gray gull — *Larus modestus* Tschudi
Tobago orange-winged Amazon — *Amazona amazonica tobagensis* Cory
Guatemalan screech owl — *Otus guatemalae guatemalae* (Sharpe)
Blue-tailed hummingbird — *Amazilia cyanura cyanura* Gould
White-tailed trogon — *Trogon viridis chionurus* Sclater and Salvin
Burmese stork-billed kingfisher — *Pelargopsis capensis burmanica* Sharpe
Northern golden-fronted barbet — *Capito niger punctatus* (Lesson)
Chestnut sparrow — *Passer eminibey* (Hartlaub)
Green-backed twinspot — *Mandingoa nitidula nitidula* (Hartlaub)
Steel-blue combasou — *Hypochera amauropteryx* Sharpe
Northern black-cheeked waxbill — *Estrilda erythronotos charmosyna* (Reichenow)
Nuttall's sparrow — *Zonotrichia leucophrys nuttalli* Ridgway

THE BREEDING PROGRAM

A cold, wet spring in the New York area had a drastic effect on the Bird Department breeding program this year, particularly affecting egg production in many species of waterfowl. Only 1,099 eggs were recorded in the Department's "Egg Log" for the year, the lowest count in the past seven years. A planned reduction in the number of commoner breeding forms, such as wood ducks, also contributed to the decrease in eggs. The failure of the West Indian flamingo flock to produce young was most disheartening, for last year's breeding activity and successful rearing of a chick gave great promise. An act of vandalism that resulted in the death of one of the females, early in the season, seemed to upset the entire flock. Only a single egg was laid, and it proved to be infertile. Quite the opposite case was true, however, in the Treetops display at the Aquatic Bird House. The limited success of last year's nesting activity in this exhibit developed into a population explosion in 1967, with the rearing of 15 boat-billed herons. Also worthy of special note was the rearing of 17 crested wood partridges, a species with which we have been working closely for several years. Inca terns, Kittlitz's sandplovers, African spur-winged plovers, white-faced tree ducks, black-necked stilts, and black-winged stilts all reared young again this year; and to this list of regular breeders we can add the following species that bred in the Zoo for the first time: scarlet ibis, Ross's goose, Andean gull, Sudanese crimson-faced waxbill, and red-crested cardinal. In all, 138 birds of 38 species were reared in the park during 1967.

Physical Improvements

The long-planned renovations of two of the Bird Department's older facilities got under way early in the fall of 1967. The Pheasant Aviary, erected in 1905, is now undergoing a modest overhaul that includes a new heating system, holding cages, and running water. Habitat landscaping, decorative pools, and enlargement of exhibits complete the picture for a more meaningful and healthful display. Rehabilitation of the Eagle Aviary, a Zoo exhibit since 1912, began in late October. Complete replacement of all cage structure was necessary in this area, retaining only the original concrete shelters. New pools and larger exhibits fronted with single-strand tension wire will do much to enhance the suitability and visibility of this exhibit. Both areas are scheduled to reopen in 1968.

While lacking the aesthetic virtues of habitat displays, departmental holding areas are extremely vital to the maintenance of a large collection. The Ostrich House, one of the Bird Department's prime reserve areas, underwent a thorough face-lifting during the summer of 1967. New air-circulating units plus a complete overhaul of cages and pools brought this major wintering facility up to date. Fresh paint and translucent fiberglas partitions between the cages have transformed this old reserve into a workable quarantine area.

Much thought and effort were devoted to the final planning of the forthcoming World of Birds exhibit building, which is being designed by the firm of Morris Ketchum, Jr., and Associates. By the end of the year, plans were nearly 65 percent complete and construction is scheduled to begin in 1968.

RESEARCH

Lack of sufficient staff continued to make the institution of significant departmental research impractical, but the department has given increasing assistance to projects carried on by the Institute for Research in Animal Behavior, not only providing birds and keepers to help maintain them but also frequent consultation and advice.

In a joint project with the Institute, an exhibit is now in preparation to house a colony of fighting snipe (*Philomachus*). This enclosure has been designed to meet the dual requirements of a public display and a behavioral research study area. Once again this year two students from Cornell University worked in the department as part-time keepers and part-time student researchers under the Summer Student Research Program that the Society has offered in conjunction with Cornell University for the past three years. The students worked in the Aquatic Bird House and produced papers from their observations of several breeding groups of birds in the displays.

With the new World of Darkness building nearing completion, research into the captive management of oilbirds (*Steatornis*) was started during June. This monotypic highly specialized member of the goatsucker family is found only in caves of northern South America and the island of Trinidad. Mr. Conway and Mr. Bell visited Trinidad to explore the possibilities of keeping these strange, nocturnal cave dwellers and brought several specimens back to the Zoo. A captive diet was developed to replace the palm and laurel fruits that these birds feed upon in the wild. One specimen has been successfully maintained for more than six months.

OTHER ACTIVITIES

Mr. Conway's term as President of the American Association of Zoological Parks and Aquariums accounted for much of his extracurricular activity during the year. He also served as a member of the Board of Directors of the National Audubon Society and of several other wildlife organizations.

Mr. Bell served on the Borough President's ad hoc committee for conservation in Pelham Bay Park.

Both curators attended zoo conferences in Mexico City and Tampa, Florida, and Mr. Conway attended the International Zoo Directors meetings in Barcelona. Mr. Crandall and Mr. Bell attended a regional zoo meeting in Utica, New York.

CENSUS OF BIRDS
December 31, 1967

Orders		*Families*	*Species and Subspecies*	*Specimens*
SPHENISCIFORMES	penguins	1	8	50
STRUTHIONIFORMES	ostriches	1	2	4
RHEIFORMES	rheas	1	2	12
CASUARIIFORMES	cassowaries, emus	2	2	3
TINAMIFORMES	tinamous	1	2	8
PODICIPEDIFORMES	grebes	1	1	6
PELECANIFORMES	pelicans, cormorants, etc.	3	8	27
CICONIIFORMES	herons, ibises, storks, etc.	5	28	103
PHOENICOPTERIFORMES	flamingos	1	6	52
ANSERIFORMES	swans, ducks, geese, screamers	2	99	500
FALCONIFORMES	vultures, hawks, eagles	4	19	27
GALLIFORMES	quail, pheasants, etc.	5	19	91
GRUIFORMES	hemipodes, cranes trumpeters, etc.	5	28	91
CHARADRIIFORMES	plovers, sandpipers, gulls, etc.	9	52	245
COLUMBIFORMES	pigeons, doves, sandgrouse	1	19	32
PSITTACIFORMES	parrots, etc.	1	16	39
CUCULIFORMES	touracos, cuckoos	1	5	7
STRIGIFORMES	owls	2	18	41
CAPRIMULGIFORMES	frogmouths, nighthawks, etc.	3	3	4
APODIFORMES	hummingbirds	1	6	10
COLIIFORMES	colies	1	1	6
TROGONIFORMES	trogons, quetzals	1	3	4
CORACIIFORMES	kingfishers, hornbills, etc.	4	15	31
PICIFORMES	barbets, toucans, woodpeckers	3	16	33
PASSERIFORMES	perching birds	28	173	472
	TOTALS	87	551	1,898

Summary: orders, 25; families, 87; species and subspecies, 551; specimens, 1,898.

DEPARTMENT OF HERPETOLOGY

F. Wayne King, *Associate Curator*

The Department's collection of reptiles and amphibians numbered 535 specimens of 253 species and subspecies at the end of the year. This represents the fewest number of animals that have been on hand in recent years. It is the result of our reducing the size of the collection in preparation for the forthcoming renovation of the lobby and center island areas of the building.

PHYSICAL IMPROVEMENTS

During the year a number of modifications were made in the existing exhibits and service areas. The breeding enclosure for the Chinese alligators was finished with the installation of a large heated pool in an off-exhibit area, complete with an infrared-heated nesting bank. Shelves were installed in the quarantine rooms for holding a series of small cages for animals not on exhibit. Several large holding cages were also constructed in the quarantine room for housing large pythons when they are not on exhibit. Microspray sanitizing units were installed throughout the service areas for mixing and dispensing the germicidal solutions used in disease control and general cleaning. A high-pressure cleaner was purchased for cleaning the public areas as well as the exhibits, and floor drains were installed in the quarantine rooms so that area can be thoroughly cleaned for disease control. An enclosed steel shed was erected behind the Reptile House for holding garbage cans and bags of gravel used in exhibits; new lighting boxes were installed in the north passage exhibits; spray nozzles were added to several cages in the north passage to provide the high humidity needed by the snakes that have trouble shedding their skins; and the installation of the snake-bite emergency bell system was completed.

The American alligator exhibit was renovated with the addition of new Spanish moss and plastic plants. New exhibits of a Southern swamp and a Southern deciduous forest were completed in the north passage. The large enclosure at the east end of the building was renovated for exhibiting the Galapagos tortoises. In this enclosure the tortoises can be kept on public view throughout the winter months. Large new graphics which explain the animal speciation that has occurred in the Galapagos Islands, and the plight of the few remaining giant tortoises there, were completed and installed by the Department of Exhibition and Graphic Arts.

THE COLLECTION

Our collection of 109 lizards, of 44 species and subspecies, constitutes the largest numbers of these animals that we have had in recent years. Most of them are exhibited in the new American desert exhibit, in the Asian and African desert, and in the rain forest cages.

We received prairie rattlesnakes, a Hopi rattlesnake, Arizona black rattlesnakes, and Hispaniolan ground lizards from Karl Kauffeld of the Staten Island Zoo, in exchange for an Indian python. Dr. Zdenek Vogel of the Suchdol Herpetological Station in Czechoslovakia sent us a small number of European glass lizards and slow worm lizards in exchange for several North American water snakes, rat snakes, rattlesnakes, and Texas tortoises. Rhea Warren, of Miami, Florida, donated a small collection of Haitian tree snakes, dwarf boas, and Cuban giant anoles. Al Arroyo, of the Zoo commissary, donated several African giant pyxie frogs and grooved-crown frogs.

Two Congo dwarf crocodiles, two dwarf caimans, four smooth-fronted caimans, and a Morelet's crocodile were added to the collection in hopes that a breeding program can be established for these species in future years. The numbers of crocodilians are dwindling because of man's persecution, and their continued survival may well depend on being able to breed them in captivity. It was for this reason that a breeding enclosure was constructed for the Chinese alligators. Very little is known about the breeding habits of the Chinese alligator aside from the fact that mating takes place in the late winter or early spring. We are hopeful that they will breed this coming spring.

A Warren's girdled lizard bred this year and gave birth to two young. Two Asiatic cobras bred in June and laid clutches of 17 and seven eggs during August. This was the eighth breeding-laying for one of the females and the fifth for the other.

The following animals gave birth to young or laid eggs this year, but were not bred in the Zoo: a Western diamondback rattlesnake, a Northern copperhead, a Gold's tree cobra, and two Jackson's chameleons.

RESEARCH AND OTHER ACTIVITIES

Visiting Research Fellow Allen Vinegar finished his studies of python metabolism at the Zoo during September and left for California State College at Long Beach, where he now occupies a staff position.

The department assisted several persons with aspects of their research. Dr. Maimon Cohen and Dr. Carl Gans of the University of Buffalo, and Ken Fischman of Queensborough Community College utilized our large crocodilian and snake collections in their studies of reptile chromosomes. A continuing study of reptile parasites was established in cooperation with the Animal Hospital and Dr. L. W. Clausen of Columbia University. This study should enhance our success in keeping animals in good health through increasing our understanding of reptile parasites, their treatment, and their control.

The Associate Curator attended the December meeting of the American Association of Zoological Parks and Aquariums in Tampa, Florida, and hosted a tour of the Reptile House and research facilities of the department by members of the American Association for the Advancement of Science, which met in New York in December.

PUBLICATIONS

Brazaitis, Peter: Endangered! *Animal Kingdom,* 1967, LXX (4): 122–127.

CURRENT LONGEVITY RECORDS – 1967

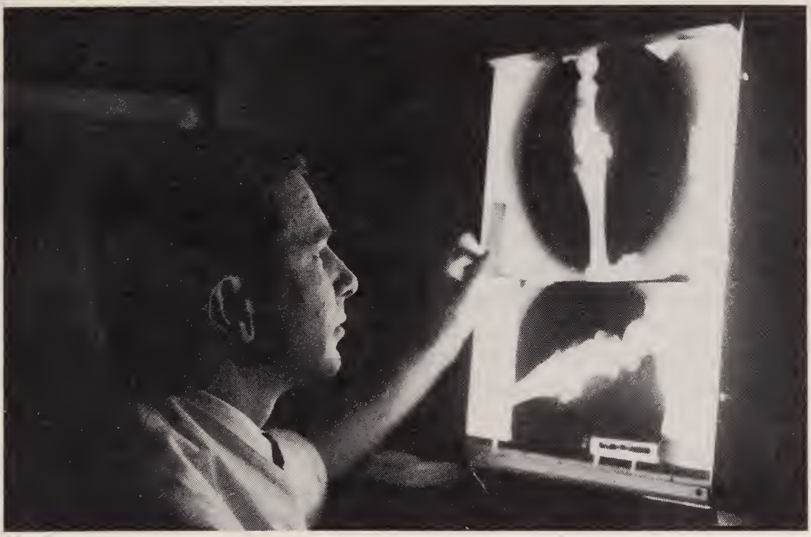
Species	*Arrived in Park*
Albemarle giant tortoise, *Geochelone e. elephantopus* (Harlan)	1928
Duncan Island tortoise, *Geochelone e. ephippium* (Gunther)	1928
Indian gavial, *Gavialis gangeticus* (Gmelin)	1946
American alligator, *Alligator mississipiensis* (Daudin)	1950
American alligator, *Alligator mississipiensis* (Daudin)	1951
Star tortoise, *Geochelone elegans* (Schoepff)	1954
Burmese python, *Python molurus bivittatus* Schlegel	1954
Giant sideneck turtle, *Podocnemis expansa* Schweigger	1955
Flathead sideneck turtle, *Platemys platycephalia* (Schneider)	1955
Asiatic cobra, *Naja naja kaouthia* x *N. n. naja*	1955
Black sideneck turtle, *Pelusios niger* (Dumeril, Bibron)	1956
Indian gavial, *Gavialis gangeticus* (Gmelin)	1956
Chinese alligator, *Alligator sinensis* (Fauvel)	1956
Chatham Island tortoise, *Geochelone e. chathamensis* Van Denburgh	1957
Chatham Island tortoise, *Geochelone e. chathamensis* Van Denburgh	1957
King cobra, *Ophiophagus hannah* Cantor	1957

CENSUS OF AMPHIBIANS AND REPTILES

December 31, 1967

Orders	AMPHIBIA	*Species and Subspecies*	*Specimens*
CAUDATA	Salamanders	7	15
SALIENTIA	Frogs and toads	15	26
	REPTILIA		
TESTUDINATA	Turtles	59	115
CROCODYLIA	Alligators and crocodiles	20	60
SQUAMATA			
SAURIA	Lizards	44	109
SERPENTES	Snakes	108	210

Summary: orders, 5; species and subspecies, 253; specimens, 535.



ANIMAL HOSPITAL

CHARLES P. GANDAL, *Veterinarian*

JOHN M. BUDINGER, *Consultant in Pathology*

PREVENTIVE MEDICINE is one of the zoo veterinarian's prime functions; this includes quarantine, vaccination, nutrition, general sanitation, and other routine procedures. In addition, one of the veterinarian's most critical and vitally important functions is the early recognition and management of potentially dangerous and widespread disease situations.

One has only to remember the recent foot and mouth disease outbreak in Great Britain to understand our grave concern and the constant vigilance exerted to prevent any such malady from afflicting our specimens. As an example, early this year a highly virulent bacterial enteritis caused several losses in our blackbuck herd. Extensive cultures were made and we learned that a young Siberian ibex, which had died during the blackbuck herd problem, succumbed from the identical organism. Immediately the most stringent sanitary and quarantine measures were instituted and the disease did not spread. Our resident pigeon population could well have transmitted the disease from one corral to another, as we have often suspected in the case of avian diseases.

Another interesting example is that of contagious ecthyma, or sore mouth, diagnosed and reported at an early stage in one of our Children's Zoo lambs. In cooperation with the United States Department of Agriculture proper quarantine and isolation procedures were instituted and no further occurrence was noted.

Early detection and culture and sensitivity testing of all the Galapagos tortoises enabled us to eliminate a potentially serious threat from a severe and very resistant enteric infection, through daily injections with the broad spectrum antibiotic chloramphenicol.

The mammalian collection accounted for some particularly interesting cases, including a group of 15 little brown bats that required antibiotic medication in their food to overcome a respiratory problem and a caesarean on a Maxwell's duiker. In addition, over two dozen individuals were given preventive vaccinations. Of special interest was the handling of a hand-reared leopard cub who received eight separate inoculations in all to protect it against the common endemic feline diseases.

The normal amount of parasitism was treated with routine pre- and post- treatment stool examination. The results of the herd treatment of our entire group of zebras and the intensive attempt at eradication of the ascarid problem in our large feline collection were pleasing. Our healthy young zebra filly, born on August 2, 1967, attests to the value of strict parasite control in the equines.

The usual amount of traumatic wounds were cared for within the avian collection. The use of intravenous fluids to help overcome shock and circulatory collapse in surgical and posttraumatic patients has been very rewarding and accounts for saving the life of several patients. Routine blood uric acid tests were run on all birds suspected of having gout with the intention of utilizing some of the newer drugs that are available for treatment of the human gout syndrome. Of special interest was the problem of coccidiosis among many of the finches that were purchased for the Institute for Research in Animal Behavior collection. Through intensive therapy and sanitary procedures the problem was overcome.

Interesting cases within the reptilian collection include the successful treatment of rectal prolapse in a Columbian giant toad, the systemic and intestinal treatment for amebiases of several group exhibits, utilizing a combination of oxytetracycline, diodoquin, and emetine, as indicated. The diagnosis of cutaneous filariasis in several specimens of snakes was arrived at following Dr. Budinger's histopathological examination of lesions that are commonly called "skin fungus," and at present we are attempting to find satisfactory filaricidal drugs that will overcome this condition. Two interesting surgical cases occurred in the reptile collection – the removal of a baseball-size granuloma from the neck of an 80-pound Indian python and the removal of a marble-size malignant tumor that encircled the tongue of a pilot black snake. Both operations were accomplished under methoxyflurane anesthesia and the animals were given Ambex injections postoperatively for several weeks to maintain their fluid and electrolyte balance until they were capable of eating.

In cooperation with Dr. King and Dr. Lucy Clausen (now a Fellow of the NYZS) a comprehensive preventive medicine program was initiated. It included routine stool examination and treatment for parasites, the use of quartenary ammonium compounds for sanitizing cages, pools, and equipment (in hopes of controlling the spread of amebiases as well as other pathogens), and the investigation of different vermifuges for efficacy in reptiles. Unfortunately, it was found that two of our most satisfactory mammalian vermifuges, dithiazanine iodide and disophenol, were highly toxic to certain species of snakes and, therefore, could not be used.

Noteworthy among the losses for the year were: our old male okapi, from tuberculosis; a male reindeer, from tetanus, presumably incurred through wounds to his antlers while in velvet; a female black leopard, from a severe postpartum metritis; and one of our emperor penguins, from aspergillosis.

The veterinarian assisted the Aquarium by autopsying "Olaf" and determining that his untimely death resulted from a volvulus of the intestine and also assisted with a disease problem in their penguins, determining that losses had occurred from a form of avian malaria. He autopsied the walrus "Sapiunuk" that died of an intestinal stoppage, the result of swallowing a rubber ball.

HOSPITAL

Significant improvements in the Hospital were achieved by the laying of an impervious Durok floor in the morgue. In addition, a recording unit was added specifically for autopsy work. A human-style incubator was secured and adapted for use on a variety of different size animals.

Throughout the year the veterinarian procured films, which were shown to selected curator and keeper audiences on nutrition, parasites, identification of animals, heart resuscitation, and other allied subjects.

PERSONNEL

On May 10, 1967, James Coder became Hospital Keeper, exchanging positions in the Bird Department with former Keeper Gus Waltz, who had been in the Hospital since 1956.

PROJECTS AND CO-WORKERS

We continue to expand our investigations into the field of immobilizing drugs and have found important use for M-99, which just this year became available to us in quantity. In addition, we have been investigating other narcotic and tranquilizing agents, including Numorphan, Triflupromazine, and Acepromazine. We have also found Sernylan to be ideally suited for immobilization of primates.

Throughout the year consultations were held with the curatorial staff on improvement of dietary practices and simplification of food preparation and ordering procedures. Changes were made in the basic small mammal diet to effect a more balanced mineral content. The Lion Island diets were carefully revamped to insure adequate calcium and vitamin D in this actively breeding group. Dry commercial foods were used with notable success in the wolf and polar bear groups and the crocodilian diets were supplemented with vitamin E to prevent the development of steatitis which had been rather common in recent years.

Our initial survey of antibiotic blood levels in Indigo snakes revealed that snakes are capable of high blood levels for up to seven days following an injection of a drug that is usually metabolized within a single day in mammals and birds.

In April, Dr. John M. Budinger was appointed Consultant in Pathology and thus continues his excellent relationship and invaluable aid to us in the field of clinical pathology and general medical advice. Throughout the year he examined 602 individual specimens and has been extremely helpful in our work on all phases of zoo animal disease.

Dr. Lucy Clausen, Professor of Microbiology and Parasitology and Secretary of the Faculty at the College of Pharmaceutical Sciences, Columbia University, initiated cooperative studies with us on reptilian parasitology. Her invaluable aid has been and will continue to be of great value in upgrading the reptilian medical practices. Two excellent students, Fred Mutzman and Michael Lubrano, worked with her at the Zoo Hospital throughout the summer.

Miss Hannah Hinsch, B.S., a junior veterinary student at the University of Pennsylvania, working as summer research associate, gathered extremely valuable and pertinent data on reptilian anesthesia.

OTHER ACTIVITIES

The veterinarian received the following appointments: Assistant Professor of Clinical Pathology at New York University Medical Center, a member of the Satellite Regional Primate Colony Planning Committee, and a senior member of the Exotic and Zoo Animal Section of the National Veterinary Television Advisory Board of the American Veterinary Medical Association.

Papers presented were:

"Monkeys and the veterinary practitioner," Cornell University Annual Veterinary Conference, Ithaca, New York.

"Handling and treatment of pet monkeys," two seminars presented at Cornell University Annual Veterinary Conference, Ithaca, New York.

"Drugs used in the zoo," International Symposium of Comparative Pharmacology, Washington, D.C.

"Avian surgery and anesthetic techniques," two seminars presented at the American Animal Hospital Association Annual Meeting, New York City.

"Veterinarians, curators, keepers, minerals," Northeast Regional Zoo Conference, Utica, New York.

The veterinarian attended the following meetings:

Cornell University Annual Veterinary Conference, Ithaca, New York.

Satellite Regional Primate Center Planning Conference, Long Island, New York.

International Symposium on Comparative Pharmacology, Washington, D.C.

American Animal Hospital Association Meeting, New York.

Seminar, Dr. H. Harlow, Effectional Systems in Primates, Creedmore State Hospital, New York.

Region 1 Mid-winter American Animal Hospital Association Meeting, Vermont.

Cornell University Symposium on Bone and Joint Disease, Ithaca, New York.

Northeast Regional Zoo Conference, Utica, New York.

In addition the veterinarian gave lectures to:

New York State X-Ray Technicians Association, Explorer Scout pre-medical group, Bronxville, New York.

Croton Rod and Gun Club.

City College Caducus Society.

Putnam Kennel Club.

Pleasantville Junior High School.

Fairfield County Veterinary Medical Association.

Publications were:

Drugs used in the zoo, Federation Proceedings, Vol. 26 No. 4, July–August, 1967.

FIRST AID AND LABORATORY STATISTICS

Vencenza Martine, R.N., our regular nurse, and Peggy Cahn, R.N., our weekend nurse, treated 1,647 first aid cases, of which 681 involved our own employees.

The Hospital laboratory recorded 801 specimens, including routine bacterial cultures, sensitivity tests, blood tests, urine tests, and stool examinations. Of these 449 involved mammals, 229 birds, and 123 reptiles.

In the Mortality Tables that follow, "Total in Collection" is arrived at by adding to the census at the beginning of the year all animals acquired by purchase, exchange or gift or born alive. Animals disposed of alive by sale or exchange during the year are not deducted. No acclimatization period following birth or arrival is allowed.

MORTALITY TABLE

MAMMALS

Year	*Total in Collection Throughout the Year*	*Died*	*Mortality Percentage*
1967	1116	234	20.96
1966	970	159	16.21
1965	974	156	16.01
1964	857	134	15.63
1963	839	136	16.20

Average Mortality 5 years..17.22

Average Mortality 20 years..17.51

BIRDS

Year	*Total in Collection Throughout the Year*	*Died*	*Mortality Percentage*
1967	2032	425	20.91
1966	1996	239	11.97
1965	1991	270	13.56
1964	1866	331	17.59
1963	2012	334	16.60

Average Mortality 5 years..16.25

Average Mortality 20 years..16.00

1967 figures include special collections maintained for the Institute for Research in Animal Behavior.

DEPARTMENT OF EDUCATION

Herbert J. Knobloch, *Curator*

Bonnie D. Green, *Zoology Instructor*

Victoria Ginsberg, *Zoology Instructor*

The department can once again report new records for the year 1967 with regard to visits by school classes and other organized educational groups to the Zoological Park. The school/organization and attendance figures (7,115 and 338,088, respectively) are new highs. The totals for the year as compared with 1966 are as follows:

	1966	*1967*
Schools, organizations, and institutions	5,996	7,115
Classes and organized groups	12,072	9,767
Total class/group attendance	330,783	338,088

May, consistently our best month of the year for attendance by school classes and educational groups, was again a record breaker. The school/organization figure (1,878) and the attendance figure (100,651) are new records not only for the month of May but also for any one month period in the history of the Zoological Park. May 1966 as compared to May 1967 is as follows:

	May 1966	*May 1967*
Schools, organizations, and institutions	1,627	1,878
Classes and organized groups	2,238	2,849
Total class/group attendance	87,847	100,651

June, traditionally our second-best month of the year in attendance, was true to form and ended with excellent total attendance figures. (The figures for June 1966 remain a record.) A comparison of June figures for the two years follows:

	June 1966	*June 1967*
Schools, organizations, and institutions	1,544	1,384
Classes and organized groups	3,198	2,667
Total class/group attendance	85,328	75,266

Day camps, play schools, church schools, Operation Head Start groups, and other organized educational groups continued to visit the Zoological Park in large numbers throughout the summer as indicated by the figures below for July and August:

	July 1966	*July 1967*
Schools, organizations, and institutions	917	698
Classes and organized groups	1,696	1,409
Total class/group attendance	51,806	46,391
	August 1966	*August 1967*
Schools, organizations, and institutions	703	881
Classes and organized groups	1,283	1,842
Total class/group attendance	41,361	51,581

The totals for August 1967 are undoubtedly new highs as near as can be determined from past records.

VISUAL AIDS

The department assisted with the production of our motion picture film "Adventure in Learning." It was produced with our associate producer, Evan J. Anton Productions Limited. The film is concerned with the Department's summer workshop courses.

Another film, "Carnival Under the Sea," produced by the Noumea Aquarium and purchased for the Society early in the year by Trustee John Pierrepont, was edited with the cooperation and help of Aquarium Curator Robert Morris for showing at the Annual Meeting.

Late in the summer, our Argentina wildlife film, "From the Pampas to Patagonia," was recorded and completed. It was also produced by Evan J. Anton. General Director William Conway and Trustee Robert G. Goelet collaborated on the film and advised during production.

There were 62 rental orders for our films, which were viewed by 7,325 persons. On 31 occasions 53 films were used by staff officers to illustrate lectures before groups totaling 5,594 people. During the 26 special showings of our films outside of the park, 79 films were used and 7,244 persons saw them. There were four preview requests and on two occasions sections of films were shown on television.

Forty-two films (one each session) were shown to the 270 students attending our summer workshop courses. Fifty-eight films (one each session) were viewed by the 4,526 students during the Natural History Auditorium Programs.

GUIDED TOURS

Fifty-seven guided tours, many of a special nature, were conducted for 2,834 persons.

SPECIAL GUIDED TOURS

During the summer and early fall a new, experimental educational guided-tour program for the general public was tried.

Starting in late July, following a period of orientation, training, and research, we conducted 38 special small-group guided tours of the Aquatic Bird House for 735 members of the general public. The program continued through the early part of September. During the latter part of September and October tours were conducted only on Saturdays. In spite of the fact that these tours were experimental, they proved quite successful.

SCHOOL LECTURE SERVICE

The Department's zoology instructors visited 103 schools, organizations, and institutions and gave 177 illustrated talks to 36,105 students. A number of special programs were presented throughout the year.

ANIMAL NURSERY

The Animal Nursery opened for the season on Saturday April 8 and closed on Sunday evening October 29.

PERSONNEL

Miss Victoria Ginsberg joined the staff of the department on March 27. She is a graduate of the University of Connecticut, where she was a zoology major.

Mrs. Inger Bradbury transferred to the Institute for Research in Animal Behavior as an assistant to Dr. Peter Marler on April 7.

Miss Geraldine Cunningham temporarily came to us again for the summer months through the Urban Corps–Summer Internship Program. As in the past, Miss Cunningham assisted us with film work.

Miss Phyllis D'Amato also came to us through the same New York City aid program and conducted tours of the Aquatic Bird House for the general public, as reported earlier.

Miss Diana Fein and Miss Patricia Duggan staffed the Zoo's Animal Nursery.

Miss Sandra Washington assisted the department with clerical work in July and August through the Neighborhood Youth Corps.

LECTURES

Department members gave 22 lectures to 1,488 persons throughout the year. The staff also participated in three television shows.

AUDITORIUM

Working closely with Robert Rice, District Science Coordinator for School District No. 8 in the Bronx, second-grade curriculum-oriented Natural History At-Zoo programs were prepared the end of last year and were started in January. The totals are:

	No. of Programs	*No. of Classes*	*Attendance*
District #8	29	78	2,722
District #10	36	96	3,473
Other	7	17	513
Totals	72	191	6,708

Regular (third through sixth grades) Natural History At-Zoo programs for the year were:

No. of Programs	*No. of Classes*	*Attendance*
58	124	4,526

MISCELLANEOUS

With the departure of Dr. Herndon Dowling in March, Mr. Knobloch curated the Department of Reptiles, as Acting Curator of Reptiles from that date until July 1, at which time Dr. King assumed charge of the department as Associate Curator.

By March 8 more Society–American Broadcasting Company half-hour television shows were completed, for a total of 13 in the series. Just prior to the completion of the series the show was canceled by ABC due to programing changes. A number of the shows were not aired. Mr. Knobloch acted as project coordinator.

Throughout the year Mr. Knobloch continued to represent the Society and attend all monthly meetings (both Executive Committee and regular) of the 52nd Precinct Community Council. He handled all publicity for the Council regarding its activities. In December Mr. Knobloch was elected First Vice Chairman of the Council.

Our 35th and 36th In-Service Courses, for elementary, junior, and senior high school teachers, "Utilization of the New York Zoological Park in the Science Program of elementary and secondary schools," were given in the spring and fall; 49 and 40 teachers attended, respectively.

In the spring three more special New Haven Railroad Zoo trains brought 5,534 more visitors to the Zoological Park.

Nine 4–6 day Summer Workshop Courses for 270 third- to ninth-graders were given during the summer.

In November, the department moved from the administration building to its new quarters in the basement of the Heads & Horns Museum, following the completion of the renovation. The task was not easy in that it involved the movement of hundreds of thousands of feet of film and a great deal of recording and motion picture equipment.

DEPARTMENT OF EXHIBITION AND GRAPHIC ARTS

JERRY M. JOHNSON, *Curator*

THE PAST YEAR was one of the busiest in the history of the Zoological Park, with exhibition projects under way in several areas. The volume of construction, both for new buildings and renovations of existing exhibit areas, kept the Department busy in many corners of the Park.

EXHIBITION

The project with which we have been most involved during the year has been the World of Darkness building. Sketches of exhibits and graphics were made, studied, and turned into models. Molds were made of various props to be used in the exhibits and then cast in fiberglass and stockpiled for later use. Some of the smaller exhibits were actually completed, cut apart, and stored away.

The Department was also involved in several other interesting exhibition projects. These included: landscaping the interiors of enclosures in the new bear dens, constructing a new, but temporary, Galapagos tortoise exhibit in the Reptile House, the design and supervision of the animal and graphic exhibits at the 1967 Annual Meeting, a major renovation in two cages on the east side of the Monkey House, and the complete alteration of the old Question House, now renamed the Safari Shop.

GRAPHIC ARTS

This Department and the Department of Publications and Public Relations cooperated in production of several printed pieces, including a promotional booklet for the dedication of the Osborn Laboratories of Marine Sciences; a booklet, "Yesterday, Today & Tomorrow," by Dr. Fairfield Osborn; and a pamphlet, "Aquatic Birds – Where to Find Them in Two Hours." Other graphic projects include: two promotional mailing pieces for the Membership Department, a cover design for the 1967 Annual Report, two educational graphics for the Galapagos tortoise exhibit, the design and production of a new zoo map, and the design of a large tile mural for use in the Reptile House. In addition, a great deal of time was given to the graphics to be used in the World of Darkness.

The Department has provided a designer for the layout and design of *Animal Kingdom* magazine.

PLANNING

The major planning project to get off the ground during the year was that of the World of Birds. Others included: plans for the renovation of the Lion House, the Great Apes building, and the Reptile House lobby. The Department also worked on plans for a cold water fishes building at the Aquarium; an Aquarium master plan; a Zoo master plan; a study of the curatorial office space at the Administration Building; a study for the development of a Library and Reading Room at the Administration Building; and a plan to redevelop the outdoor food stand and picnic area at the Aquarium.

PERSONNEL

In order to meet the growing demands upon the Department, two graphic designers were hired, Mrs. Edi Holley and Miss Eideen Molloy. In addition, an Exhibit Specialist, John Sutton, was also retained. Another change has brought the Print Shop, with Richard Larsen, printer, into the Department of Exhibition.

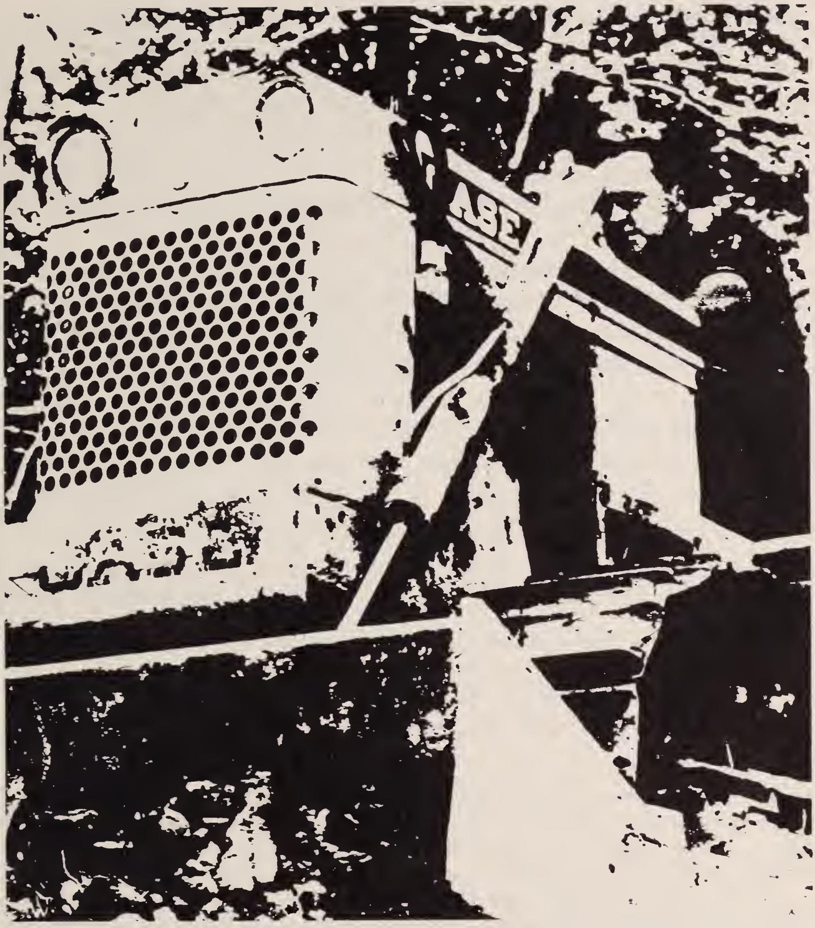
During the summer months the Department employed two fifth-year architectural students from Pratt Institute. They worked on specific design problems given them by the Curator, and it is to their credit that several of their designs have been used or are being considered for possible future application.

OTHER ACTIVITIES

During the year a very promising relationship has evolved between our organization and the Pratt Institute School of Architecture. Using the Zoological Park as an architectural problem, students sought to provide approaches to some of the immediate and long-range problems of the park, such as pedestrian traffic, dissemination of information, and public parking. The project has been very stimulating and is being followed up with a more comprehensive study.

Two exhibitions were held in the Heads & Horns building. One of these, "An Urban Zoo," was the architectural presentation of the students at Pratt Institute. The other exhibit was a one-man show of the works of the animal artist Joel Stolper.

During March, Mr. Johnson attended the American Association of Zoological Parks and Aquariums meetings in Mexico City, after which he departed for Trinidad, W.I., where he visited, among other places, the William Beebe Tropical Research Station at Simla. Mr. Johnson also attended the AAZPA meetings in Tampa, Florida, where he presented a film, "Zoo Graphics."



CONSTRUCTION AND MAINTENANCE

Charles B. Driscoll, *Superintendent of Operations*

George Russell, *Assistant Superintendent of Construction*

Louis Sanders, *Assistant Superintendent of Maintenance*

After over a decade of frustration and delay, three of our capital budget programs reached the start of construction in 1967. Work on these projects — the Kodiak and polar bear dens, the Eagles and Vultures Aviaries, and the Pheasant Aviary — combines with that well underway in the World of Darkness and on the Lake Agassiz Bison Range to produce the most active construction period experienced by the Zoo since the early 1900s.

On January 27, bids were opened on the Kodiak and Polar Bear dens. The low bid of $413,318 was close to the engineer's estimate of $413,000. Work began in May and at year's end the moats, pools, gunite back wall, and building foundation were completed.

The bids for the renovation of the Pheasant Aviary were opened on July 24 and work started in October. The low bid of $64,095 topped the engineer's estimate of $60,000. At the end of 1967 the work was 60 percent completed.

The Eagles and Vultures Aviaries' bids were opened on August 4, with work starting in October. The low bid of $178,000 was within the engineer's estimate of $200,000. During the fall of 1967 the work consisted of demolition and site work for water and drainage.

Under a New York City Department of Highways contract, the entrance plaza at Fordham Gate and the Pelham Parkway sidewalks were resurfaced and honey locust trees planted in sidewalk tree wells.

Other important additions or renovations designed, supervised and financed entirely by Zoological Society funds included:

– Construction of a Staff Dining Room next to the Cafeteria.

– Complete refurbishing of the old Question House, now called the Safari Shop.

– Construction of new offices, sound and projection rooms for the Education Department in the Heads & Horns Museum basement.

– Renovation of the interior of the Yak House.

– Conversion of the south half of the Lion House basement into an animal-holding area.

– Improvements were made at the Institute for Research in Animal Behavior. A second floor was added in the Bay Tree House, thus providing an additional 910 square feet of space for five research offices and laboratories. A refrigerated addition was added to the penguin quarters and a new refrigeration unit was installed for the Adelie penguin collection. The west greenhouse was renovated by constructing 33 inside and 12 outside aviaries. A new electric gate was installed off Bronx River Parkway and a standby gasoline generator was installed for the Air Dome.

Other smaller projects completed included:

– Construction of a Thomson gazelle shelter in the African Plains annex.

– Installation of new electric panel and lines for the north passage cages in the Reptile House, and new alarm system.

– Installation of two day-night and one three-colored vision exhibit in the Small Mammal red-light section.

– Construction of new Formica counters, storage cabinets, and shelves for the Mail Room.

– Construction of a spray room north of the Paint Shop.

– Modernization of employees' rest room in Machine Shop.

– Repairs to tractor train coaches and mules.

– Construction of a new breeding area complete with tempered water pool for Chinese alligators and a new shift cage for pythons in Reptile House.

– Improvements to the Wolf Wood holding area with the addition of water service, concrete floor slab, and shelter boxes.

– Construction of an experimental holding area with shallow pool for fish-eating bats in basement of Lion House.

– Improvements for wintering birds in the Ostrich House by installing fiberglass cage partitions, radiator covers, exhaust fans, water troughs, and additional hose cocks.

– Installation of air-conditioning units in lower floor offices of Administration Building, Construction Office, Photo Office, First Aid Building, Safari Shop, and a new standby unit for the Penguin House.

– Installation of a new main service switch in service yard electric vault.

– Painting interior of Zebra House, Ostrich House, Bronxdale Comfort Station, Commissary rooms, and 10 carretina wagons.

– Paving over 3,000 square yards of paths.

– Repairing and pointing up the marble stone work at the Rainey Gate entrance and the Lion House chimneys.

– Preparing the Children's Zoo and restaurant facilities for spring openings.

The Department, in addition to assisting in Park construction projects and maintaining the Park grounds, also carried out the Dutch elm disease control program by removing and burning infected trees and injecting 48 trees with Bidrin in the Baird Court area. Six diseased elms were removed from Baird Court and replaced with pin oaks and honey locusts. Three hundred eighty-six trees and shrubs were planted at selected locations throughout the Park.

FACILITIES DEPARTMENT

EDWARD KEARNEY, *Manager*

EDWARD QUINN, *Assistant Manager*

THE OPENING OF the Safari Shop highlighted the year for the Department. The new shop was completed in the spring, replacing the Zoo's Question House. The changeover gives the Zoo a modern gift shop featuring educational zoological items for youngsters and adults.

The Department's four restaurants, eight refreshment stands, and five mobile units adequately served the needs of thousands of visitors during the year. Success in this endeavor is largely due to the establishment of an operational philosophy keyed to the principle that a stop at one of our facilities is an enjoyable part of visiting the Zoo.

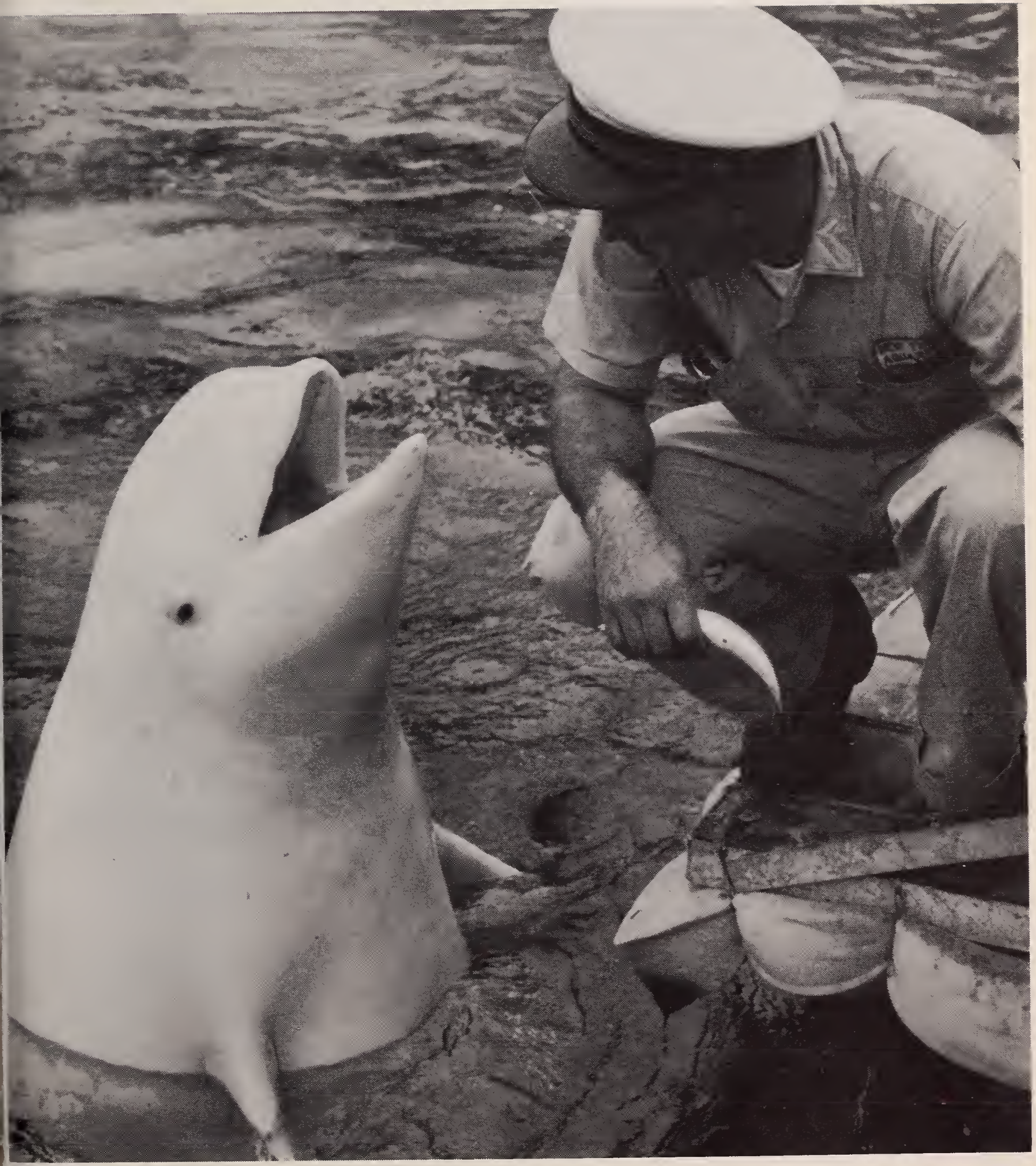
Four restaurants reported an increase of $24,000 over last year's $375,000 total. The Zoo Terrace Buffet and the Cafeteria accounted for the biggest part of this increase.

The stationary refreshment stand division reported gross sales of $156,000. This is $2,000 below the previous year.

Demand by visitors for gift and novelty merchandise shows no sign of decreasing; rather, it is increasing. At the season's end, souvenir sales were $14,000 greater than last year's $195,586.

During its eight months of operation in 1967, the Animal Riding Track provided paid rides for 265,000 children – 3,300 more than last year. In 1966 the track provided 12,005 members' passes; in 1967 free rides for members' children amounted to 18,859, a gain of 6,854 rides over last year.

THE AQUARIUM



REPORT OF THE DIRECTOR

ROSS F. NIGRELLI, *Director*

HIGHLIGHTS OF THE Aquarium's progress in 1967 were the opening of the new penguin pool together with the capture and exhibit of two new female beluga whales. During the course of the year members of the Aquarium staff consulted with architect Morris Ketchum, Jr., and his associates concerning Stage II of the proposed Aquarium expansion, which contemplates the establishment of a whale-dolphin exhibition and research complex and a building (Pelagic Oceanarium) to exhibit littoral and oceanic fishes. The analysis of the project, including sketches, drawings, and budget estimates, was completed. Prior to the opening of the Pittsburgh Aquarium, fish and sea water were contributed by our institution. Further progress was made on the photographing of fish for use as identification labels and for our photographic library.

Interior additions included air conditioning of the main hall and souvenir shop; the main hall system prevents condensation on the glass of cold-water tanks, thus improving the visibility. A public address system was installed and hydrophones were placed in the whale pool so visitors can listen to the clacks and squeaking of the belugas. A major flooring overhaul included new vinyl tiling in the restaurant and souvenir shop and a new skid-proof epoxy covering for the lower hallway and the tank room. A new feed room and an enlarged carpentry shop were completed.

Grounds improvement in addition to the new penguin pool consisted of the erection of a glass and stainless steel fence around the Polar Bay pool, greatly enhancing the viewing of its occupants; a substantial improvement of the whale filter; and the placing of directional signs on the Belt Parkway exits to Ocean Parkway.

The closing of West 8th Street by the City provided additional parking space for 201 cars and the grading, paving, and planting of this space was finished.

Attendance at the Aquarium was up 6.6 per cent for the year, which was remarkable considering the unusually inclement summer season. School group attendance increased 25.8 per cent. Souvenir sales increased 20.6 per cent.

AQUARIUM OPERATIONS

ROBERT A. MORRIS, *Curator*

LARS O. MELLKVIST, *Superintendent, Operations*

JEWELL BUNGAY, *Business Manager*

CHARLES YOUNG, *Animal Manager*

A BABY GRAY SEAL was born early in the year, marking the seventh birth in four years for the gray seal colony here. Good collections of local fish were made during the spring and summer by our aquarists at the New Jersey pound nets and in seining operations off Long Island. The variety of species and yield of these local collecting efforts is best illustrated by the following list of fish brought in during 1967:

many	sand shrimp
many	invertebrates
2	wrymouth
1	northern sting ray
6	clearnosed skate
14	common eel
15	sand shark
4	smooth dogfish
19	spiny dogfish
8	scallop
2	lobster
16	ocean pout
7	butterfish
4	flounder
7	sea raven
8	herring
36	horseshoe crab
8	northern puffer
5	southern puffer
27	sea robin
1	tautog
5	menhaden
many	northern spearing
50	mackerel
188	three-spined stickleback
32	northern pipefish
19	short-nosed sturgeon
2	common sucker fish
4	yellowtail flounders
9	cod fish
12	rock crab
6	bullhead
4	sunfish
2	hogchocker sole
6	common carp
2	gold carp
1	bronze carp
4	pearl roach
18	Johnny darter
27	toadfish
3	Tommy cod
4	striped bass
2	electric torpedo ray
15	sea bass
1	northern sea horse
4	bluefish
3	ridley turtle
8	spider crab
3	loggerhead turtle
1	burr fish
1	red starfish
2	file fish
1	harvest fish
15	northern porgy
1	sun dial
1	white perch
1	look down
1	mako shark
1	common butterfly fish
18	sculpin

In cooperation with Princeton University Auditory Research Laboratories, several bottlenose dolphin were exhibited during the summer and in the fall we received three Pacific white-sided dolphins in an exchange with Marineland of the Pacific. We lost our remaining walrus, "Sapiunuk," by intestinal blockage caused by a small rubber ball. Our schooling fish tank was enhanced by the addition of new shoals of mackerel, and this unique display has drawn admiring comments from many professional visitors. In October several penguins were lost due to an outbreak of avian malaria caused by the suspected parasite *Plasmodium relictum*. To date there is no known treatment for this infection, but several institutions are continuing to search for a cure.

In June a preliminary expedition was sent to the Eskimo village of Pond Inlet on Northern Baffin Island, Northwest Territories, to investigate the feasibility of capturing live narwhal. The party was met by a contingent from Marineland of the Pacific. It was determined that such a capture was practicable but only in a succeeding year due to the inability to obtain the necessary boat charter in the 1967 season. From Pond Inlet they flew to the prospective capture site at Koluktoo Bay and determined the required equipment, personnel, and strategy.

In August the curator and two assistants departed for Churchill, Manitoba, Canada – on the western side of the Hudson Bay – for the purpose of procuring additional belugas, females that would be mated to our existing males. The expedition chartered eight canoes and one large boat and proceeded 40 miles to the camp site at Seal River with a local party of Indians and Eskimos. The animals were herded into shallow water; members of the expedition jumped into the water, fastened a noose on the belugas' tails, put them on stretchers, and transported them on the large boat to Churchill, where the chartered plane was waiting to return them to New York. The two new specimens, weighing 600 pounds and 625 pounds, respectively, were placed in the shallow end of the whale tank separated from the males by a plastic-covered steel net.

Specimen exchanges were made with John G. Shedd Aquarium in Chicago, Aquarama in Philadelphia, Sea-Arama in Galveston, Dallas Aquarium, Marineland of the Pacific, Vancouver Public Aquarium, and Steinhart Aquarium in San Francisco.

Our year-end census showed 199 species represented by 2,598 specimens. Included in the census are three jack crevalles, which were juvenile when they were brought in during 1964 and are now up to 5 pounds in weight, and our male sand tiger shark *(Carcharias taurus)*, which measures six feet in length, a rare size for this species.

Census of the Aquarium, December 31, 1967

		Species and Subspecies	*Specimens*
Phylum: Chordata			
Class: Chondrichthyes — sharks, rays, chimeras			
Orders			
Squaliformes	sharks	5	11
Rajiformes	rays, skates	3	8
Class: Osteichthyes — bony fishes			
Orders			
Dipteriformes	lungfishes	1	1
Acinpenseriformes	sturgeon	1	4
Semionotiformes	gars	1	1
Clupeiformes	tarpon, herrings, bonefish	2	6
Cypriniformes	catfishes, minnows	10	43
Anguilliformes	true eels	3	6
Gadiformes	codfishes	3	5
Gasterosteiformes	sticklebacks, pipefishes, sea horses	3	39
Cyprinodontiformes	killiformes, cavefishes	2	323
Beryciformes	squirrelfishes	3	11
Perciformes	perchlike fishes	108	605
Pleuronectiformes	flatfishes	3	10
Tetraodontiformes	trunkfishes, trigger fishes, puffers	5	5
Batrachoidiformes	toadfishes	1	18
Lophiiformes	frogfishes	1	1
Class: Reptilia — reptiles			
Order: Testudines	turtles	5	7
Class: Aves — birds			
Order: Sphenisciformes	penguins	3	17
Class: Mammalia — mammals			
Orders			
Pinnipedia	seals, sea lions	5	16
Cetacea	whales, dolphins	2	5
Phylum: Porifera			
Class: Demospongiae — siliceous, horny sponges		2	29
Phylum: Coelenterata			
Class: Anthozoa — corals, anemones		6	1,109+
Phylum: Annelida			
Class: Polychaeta — marine worms		1	1
Class: Oligochaeta — bristle-footed worms		1	100+
Phylum: Arthropoda			
Class: Crustacea — lobsters, shrimps, crabs		10	150
Class: Arachnida — horseshoe crabs		1	26
Phylum: Mollusca			
Class: Gasteropoda — snails		1	1
Class: Pelecypoda — oysters, clams		1	1
Class: Cephalopoda — octopus, squid		1	1
Phylum: Echinodermats			
Class: Asteroidea — starfishes		3	24
Class: Echinoidea — sea urchins		2	5
	Totals	199	2,589

Summary: species and subspecies, 199; specimens, 2,589.

INSTITUTIONS USING AQUARIUM SEA WATER IN 1967

Downstate University	1,010 gal.
Brooklyn Navy Yard Fire Department	700
Long Island University	40
Pittsburgh Aquarium	45,000
New York University	87
Flower Medical College	37
U.S. Navy Yard, Brooklyn	450
American Museum of Natural History	115
U.S. Navy, Laboratory of Applied Science	372
Brooklyn College	245
State University	105
Sandy Hook Marine Laboratory	1,570
	49,731

AQUARIUM ANNUAL ATTENDANCE AND FACILITIES INCOME

	Attendance		*Increase*	
	1967	*1966*	*or Decrease*	*Percentage*
Free	26,582	24,794	1,788	7.2%
Paid	361,389	339,241	22,148	6.5
Total	387,971	364,035	23,936	6.6
School free	13,119	9,960	3,159	31.7
School paid	52,533	42,206	10,327	24.5
School total	65,652	52,166	13,486	25.8
Head Start free	4,496	4,977	(481)	(9.7)
Camp groups paid	13,203	9,559	3,644	38.1
Free adult groups	2,402	4,647	(2,245)	48.3

Note: It is assumed that all free children and children paying 25¢ during September through June are school children and that there is one adult for each ten children, which comes to 6,565 additional free adults coming in with school children in 1967 and 5,210 in 1966.

Attendance, 1967

Percentage of total	
Free children	4.5%
Free adults	2.3
Paid adults	48.9
Paid children	27.1
Paid children groups	16.9
Special groups	0.3

	Percentage of Total	Weekend Percentage of Total
January	4.9%	60.9%
February	4.3	61.8
March	6.8	70.4
April	8.3	55.1
May	9.2	55.0
June	9.7	43.3
July	15.5	36.8
August	16.2	33.6
September	8.2	47.5
October	7.0	57.6
November	6.2	57.7
December	3.7	40.0

1,008 NYZS members visited the Aquarium in 1967, bringing 703 adult guests and 1,686 children.

Average paid admission 65¢ in 1967 as against 67¢ in 1966.

	1967	*1966*	*Increase or Decrease*	*Percentage*
Admission cash	234,765	227,170	7,595	3.3%
Restaurant				
Sales	73,622	69,483	4,139	5.9
Cost	57,614	54,313	3,301	6.1
P & L	16,008	15,170	838	4.6
Souvenir shop				
Sales	51,200	42,436	8,764	20.6
Cost	30,585	24,272	6,313	26.0
P & L	20,615	18,164	2,451	13.5
Parking				
Sales	54,414	58,204	(3,790)	(6.5)
Cost	9,758	10,398	(640)	(6.1)
P & L	44,656	47,806	(3,150)	(6.6)

OSBORN LABORATORIES OF MARINE SCIENCES

ROSS F. NIGRELLI, *Director and Pathologist;* MARTIN F. STEMPIEN, JR., *Assistant to the Director and Bio-Organic Chemist;* GEORGE D. RUGGIERI, S.J., *Coordinator of Research and Experimental Embryologist;* JACK T. CECIL, *Virologist;* HARRY A. CHARIPPER, *Histologist;* KENNETH GOLD, *Plankton Ecologist;* EVA K. HAWKINS, *Algologist;* MYRON S. JACOBS, *Neuroanatomist;* KLAUS KALLMAN, *Fish Geneticist;* VINCENT R. LIGUORI, *Microbiologist;* ELI GOLDSMITH, *Scientific Consultant.*

Research Associates: WILLIAM ANTOPOL, *Comparative Pathology;* C. M. BREDER, JR., *Ichthyology;* JOHN J. A. MCLAUGHLIN, *Planktonology;* MARTIN P. SCHREIBMAN, *Fish Endocrinology.*

Research Assistants: NORMAN CATES, JUDITH KALLMAN, ANNE O'MELIA.

Field Research Assistants (Cooper Island, B.V.I.): PAUL AND ROSEMARY CHAPMAN.

Technical Assistants: FLORENCE FAY, MARGARET FREUND, EDWARD LOUIE, HYMAN MUROWITZ, RICHARD MUSILEK, FERRUCCIO PAOLINI, HELEN SAWNER, JO-ANNE SCHNEIDER, TAMAR SHIMONY, FREDA SLAVIN, ROBERT VALENTI, JOHANNA VAN DE KERKHOFF.

U.S. Navy, Laboratory of Applied Science: ARNOLD FREIBERGER, CHRISTOPHER P. COLOGER, HAROLD HORBUND, PAUL CHEUNG.

Coral Reef Research (Jamaica, W. I.): THOMAS GOREAU, NORA I. GOREAU, ROSEMARY ASHBY, E. L. BOHM, EILEEN GRAHAM, Y. NEUMANN, JUDITH C. LANG.

DIRECTOR'S REPORT OSBORN LABORATORIES OF MARINE SCIENCES

ROSS F. NIGRELLI

THE YEAR 1967 marked the formal dedication of the Osborn Laboratories of Marine Sciences. With this facility in full operation, the Aquarium, long at the forefront of marine research, now has the means to delve deeply into some of the more perplexing secrets of the sea.

The construction of the laboratories was completed at the beginning of the year, and after months of preparation, the laboratories were formally dedicated on September 28. Dr. J. George Harrar, President of the Rockefeller Foundation, delivered the dedication address. More than 150 guests attended; these included Society Trustees, city officials, and eminent scientists representing many institutions in New York and other states. The ceremonies followed an open house at both the Laboratories and the Aquarium and a formal luncheon.

Since their opening, the Laboratories have had an almost continuous flow of visitors from both the United States and abroad. Several hundred members of the American Association for the Advancement of Science visited both the Aquarium and the Laboratories on December 30.

Dr. Ross F. Nigrelli delivered a paper, "Substances of Biomedical Importance from Marine Organisms," at the International Symposium on Comparative Pharmacology, Division of Biomedical Sciences, National Institutes of Health, Washington, D.C.

Through a grant from The Rockefeller Foundation, the Laboratories were able, for the first time, to offer summer training programs in various marine disciplines for college students. Students worked in the following areas: bio-organic chemistry; experimental embryology and teratology; virology and tissue culture; and water chemistry and pollution.

RESEARCH ACTIVITIES

Dr. Ross F. Nigrelli and his associates in pathology, in collaboration with Dr. P. M. Powles, Fisheries Research Board of Canada, have been studying epizootics of ichthyosporidiosis in yellowtail flounders (*Limanda ferruginea*) from the North Atlantic. Dr. Powles and his group have been concerned with ecological and statistical studies while we have been investigating the extent and microscopic analysis of the infection, a fungal disease that has been detected in several organs in the flounder.

Dr. Martin F. Stempien, Jr., has completed preliminary testing of 120 species of sponges from Jamaica, West Indies. Twenty-five of these were toxic to killifish and 28 showed antibiotic activity toward *E. coli.* Considerable progress was made in the isolation and purification of the physiologically active materials present in three Caribbean sponges. A small amount of pure antibiotic was isolated from extracts of the sponge *Agelas* sp. JC-6. Infrared spectral analysis confirmed previous chemical data that this material is a substituted dihydroxyindole. In addition, purification procedures have been initiated on extracts of the sponge *Verongia archerii.* The antibiotic material from this sponge appears to be a very labile substance.

Dr. George D. Ruggieri, S.J., has continued studies on the steroid saponins extracted from various echinoderms. Jamaica species that have been extracted and analyzed for toxic activity include echinoids: *Diadema antillarum, Mellita quinquiperforata, Clypeaster rosaceus,* and *Meoma ventricosa;* ophiuroids: *Ophiocoma echinata;* holothuroid: *Euapta lappa*; and asteroid *Oreaster reticulatus. Diadema antillarum,* long-spined sea urchins, were stripped of their spines and these were extracted to determine toxic activity. A number of chemical and physiological tests were carried out on the saponin fractions. These included acid hydrolysis, followed by paper chromatographic analysis of the liberated sugars and a test for the presence of sulfate. The presence of sulfate may be indicative of high physiological activity. The toxicity of these saponins has been tested on the killifish and on the developing sea urchin.

Mr. and Mrs. Paul Chapman, our divers and field collectors, have been moved from Jamaica, West Indies, to Cooper Island, British Virgin Islands. They have been collecting deep-sea sponges for Dr. Stempien and echinoderms for Dr. Ruggieri. These studies on the pharmacologically active materials from marine organisms have been supported by the John A. Hartford Foundation since 1962. A two-year grant extension has brought the total support to $615,725.

Dr. Jack T. Cecil has maintained vertebrate and invertebrate cell cultures in a semisynthetic medium; and although these cultures have not, as yet, been adapted to continuous cell-line passage, they have been maintained for periods sufficient for viral propagation studies. In addition, various marine biotoxins have been tested for both antiviral and cytotoxic effects on cell lines. Desulfated holothurin has been shown to be less toxic than holothurin A; and its effects, unlike those of holothurin A, have been shown to be reversible. These studies are supported by the Scaife Foundation.

Dr. Kenneth Gold is evaluating the role of ciliates in marine ecology through the *in vitro* analysis of the growth requirements of tintinnids. Until recently little attention had been paid to the significance of ciliates in the marine environment. Observations of cultures of Tintinnida in our laboratory, together with other reports on their distribution and abundance, attest to the fact that these organisms are extremely important primary links in the marine food chain. Dr. Gold has also investigated the effects of copper on the stability of thiamine in sea water. The copper ion leads to the destruction of thiamine, but chelating agents and certain amino acids protect thiamine from destruction. These research activities are supported by the Atomic Energy Commission and the Rockefeller Foundation.

Dr. Eva K. Hawkins joined our staff in September, and her research activities are concerned with investigations on the development of structure and form in marine algae. She has isolated 11 marine algal genera growing in the tanks of the New York Aquarium. Nine of these are now being maintained in artificial sea water for further studies. Dr. Hawkins is also studying the nutritional requirements of regenerates and sporelings of the marine red alga *Callithamnion roseum.* Extensive studies have been undertaken on the electron microscopic analysis of cell contact in the red alga *Ceramium diaphanum.* Elucidation of the fine structure of cell connections is essential for the interpretation of function (transmission of stimuli, translocation of nutrients). These studies are supported by a grant from the Rockefeller Foundation.

Dr. Myron Jacobs, in collaboration with Dr. P. J. Morgane and Dr. W. L. McFarland, Communications Research Institute, Miami, Florida; Dr. P. I. Yakovlev, Harvard Medical School; and Dr. S. J. Piliero, Geigy Research Laboratories, are continuing studies of the cetacean nervous system. Most of the investigations have been on slide material of the brain of the bottlenose dolphin. In addition, quantitative studies of the cranial nerves have been undertaken in three cetacean species. Comparative studies continue with the addition of three specimens (*Stenella caeruleus-alba, Pusa hispida,* and *Odobenus rosmarus*). This research is supported by the National Institutes of Health.

Dr. Klaus Kallman continued investigations of the evolution of sex-determining mechanisms and pigmentary systems in the fish of the genus *Xiphophorus.* A large number of crosses have been set up to obtain data necessary for the construction of a linkage map of sex-linked genes of *X. maculatus* that have been implicated in the formation of malignant tumors. Some experiments indicate that the expression of a pigment gene can be influenced by its location on the chromosome. In other experiments at least two autosomal genes have been identified in two stocks of *X. maculatus* that cause sex reversals; that is, they change fish with a female chromosome constitution into functional males. Dr. Martin Schreibman, who has been interested in osmoregulation in freshwater fishes, is studying the relationship between hypophysectomy, freshwater survival, and mucus production. In several species of fish, the epidermal mucus-producing goblet cells are reduced in number following the removal of the pituitary gland. Together with Dr. George H. Fried, he is also investigating the role of hormones in lipid metabolism in fish. These studies are supported by the National Institutes of Health.

Dr. Vincent R. Liguori has initiated a comprehensive program to study the adhesive material secreted by the acorn barnacle, *Balanus* sp. Techniques have been developed for mass rearing of barnacle larvae in the laboratory and for the microchemical analysis of the cement-substratum juncture. In addition, glandular elements and conducting tubules, presumably associated with the cement, have been isolated from the barnacle and are now being studied microscopically and histochemically.

The Navy's Applied Science Laboratory continues studying the effects of various fouling agents on the adhesion of barnacles.

Studies on coral reef ecology in Jamaica, West Indies, were continued under the sponsorship of the laboratories through grants received by the New York Zoological Society from the National Science Foundation and the National Institutes of Health.

A grant of $51,800 from the National Science Foundation was used to further equip the new laboratories.

General Dynamics/Electronics of Rochester made a gift of equipment to the Osborn Laboratories of Marine Sciences. This equipment, valued at $20,000, consists of an ultramicrotome for electron microscopic studies and various electronic apparatus for the study of electrophysiology in fishes.

The Scaife Foundation gave $50,000 for an electron microscope and other equipment needed for the laboratories.

PERSONNEL ACTIVITIES

In January, Dr. Nigrelli delivered the paper "Substances of Biomedical Importance from Marine Organisms" at the International Symposium on Comparative Pharmacology, National Institutes of Health, Washington, D.C.

Dr. Kallman lectured on "Sex Chromosome Mechanisms in Fish" to the Bio-Med Society at Queens College in March.

In April, Dr. Nigrelli attended the meetings of the International Society of Toxinology and the Federated Societies of Experimental Biology in Chicago. Dr. Stempien, Dr. Cecil, and Dr. Liguori served as judges at the Annual Science Fair, Brooklyn Archdiocese Catholic High Schools. Dr. Liguori gave a talk on "The Pharmacology of Marine Toxins" at the Nassau County Museum. Dr. Jacobs attended the annual meetings of the Cajal Club and the American Association of Anatomists in Kansas City.

During May, Dr. Ruggieri delivered a paper on "Drugs from the Sea" at the Symposium on the Deep Frontier at St. Joseph's College, Philadelphia. Dr. Gold attended the 2nd National Symposium on Radioecology at the University of Michigan and was a guest lecturer at the School of Epidemiology at Yale University.

In June, Dr. Nigrelli and Dr. Kallman attended the annual meeting of the American Society of Ichthyologists and Herpetologists in California. Dr. Nigrelli with Dr. Ruggieri gave a paper on "Studies of *Cryptocaryon irritans.*" Dr. Kallman delivered a paper on "Sex-Linked Pigment Patterns in the Platyfish." Dr. Kallman also attended the Conference on Population Genetics at Syracuse University. Dr. Gold presided over a symposium on "Vitamins in Aquatic Environments" held during the 30th Annual Meeting of the American Society of Limnology and Oceanography in St. John's, Newfoundland. Dr. Gold also attended the annual meeting of the Society of Protozoologists in Toronto. Dr. Liguori and Dr. Ruggieri represented the Osborn Laboraties of Marine Sciences at an organizational meeting for a proposed oceanographic center at Montauk. Dr. Schreibman attended a series of lectures on comparative endocrinology at Friday Harbor, Washington.

Dr. Nigrelli was a member of the International Committee of the Society of Protozoologists, which met in Leningrad, Russia, in July. Dr. Ruggieri represented the laboratories at a three-day meeting in August at the proposed site of the Montauk Oceanographic Center. Dr. Nigrelli attended a symposium on "Materials – Key to Effective Use of the Sea" in September. This symposium was sponsored by the U.S. Naval Applied Science Laboratory, Polytechnic Institute of Brooklyn, and New York State Science and Technology Foundation. Dr. Nigrelli spoke on "Some New Approaches to the Study of Barnacles."

In October, Dr. Nigrelli addressed the Alumni Society of Bellevue Hospital on "The Effective Use of the Sea." At the Governor's Conference, he delivered a paper on "The New York Aquarium and the Osborn Laboratories of Marine Sciences as a Center for Marine Biological Research in New York City." He also presented a paper on "Poisonous Fishes and Marine Biotoxins" at the Conference on Fish

Protein Concentrate in Ottawa. Dr. Liguori gave a talk on "Marine Microbiology" at the Nassau County Museum.

Dr. Nigrelli and Dr. Ruggieri, both members of the subcommittee on Biomedical Oceanography at the Marine Technology Society, attended a meeting in November at Long Island University to formulate recommendations to the President's Commission on Marine Biology for an international program on biomedical oceanography. In November Dr. Nigrelli gave a talk to the Association of Medical Directors on "Marine Biotoxins as Potential Drugs."

Many members of the staff attended the American Association for the Advancement of Science meetings in December held in New York.

PUBLICATIONS

DR. ROSS F. NIGRELLI

Substances of biomedical importance from marine organisms. Federation Proceedings *26*: 1197–1205. (With M. F. Stempien, Jr., G. D. Ruggieri, S.J., V. R. Liguori, and J. T. Cecil.)

DR. GEORGE D. RUGGIERI, S.J.

N-acetylhistidine in developing embryos of the killifish, *Fundulus heteroclitus* and the zebrafish, *Brachydanio rerio*. Life Sciences *6*: 609–614. (With M. H. Baslow.)

New York Aquarium and Osborn Laboratories of Marine Sciences. Science *158*: 675–676.

DR. KENNETH GOLD

The role of ciliates in marine ecology II. Feeding characteristics of *Tintinnopsis* sp. *in vitro*. Journal of Protozoology, Suppl. *14:* 16-17.

DR. MYRON JACOBS

The archicortical zone of the rhinic lobe (rhinencephalon) in *Tursiops truncatus*. Anat. Rec. *157*: 264. (With S. J. Piliero and P. I. Yakovlev.)

Specialized features of the arterial supply, ventricular system, surface configuration, and rhinencephalon of the brain of the dolphin (*Tursiops truncatus*) and comparisons of surface morphology among various cetacean species. Anat. Rec. *157*: 401. (With P. J. Morgane, P. I. Yakovlev, W. L. McFarland, and S. J. Piliero.)

DR. KLAUS D. KALLMAN

Gene and chromosome homology in fishes of the genus *Xiphophorus*. Zoologica *51*: 107–135. (With J. W. Atz.)

Enjoy your platys and swordtails. The Pet Library Ltd., Earl Schneider, ed.: 32 pp.

DR. THOMAS F. GOREAU

The shallow-water scleractinia of Jamaica, Revised list of species and their vertical distribution range. Bulletin of Marine Science *17*: 442–453. (With J. W. Wells.)

A new species of Halimeda from Jamaica. Bulletin of Marine Science *17*: 432–441. (With E. A. Graham.)

ROBERT MORRIS

A rare Hawkfish, *Oxycirrhites typus* Bleeker, found in Hawaii. Ichthyologia *39*: 71–72. (With D. Morris.)

Ahoy, the White Whale. Science World *15*: 10–11. (With E. Ricciuti.)

COLLABORATORS AND THE NATURE OF THEIR COLLABORATIONS WITH THE NEW YORK AQUARIUM

DR. EUGENE AGALIDES, General Dynamics/Electronics, Rochester, New York. Effects of drugs on electric fishes with relation to temperature adaptation.

DR. JAMES W. ATZ, American Museum of Natural History, New York, New York. Genetics of *Xiphophorus*.

DR. ION O. COCIOBA, Beth Israel Hospital, New York, New York. Microbiology of pinnipeds.

DR. REZNEAT DARNELL, Marquette University, Milwaukee, Wisconsin. Gynogenesis in *Poecilia formosa*.

DR. R. ENDEAN, Department of Zoology, University of Queensland. Studies on toxic Australian seastars.

DR. ERWIN ERNST, Chairman, Department of Biology, Setauket High School, Long Island, New York. Subaqua expert. Starfish distribution and ecology.

DR. FRANCIS H. FAY, Arctic Health Research Center, Anchorage, Alaska. Temperature regulation, nutrition, and growth of walruses.

DR. HAROLD FINK, Director of Laboratories, Coney Island Hospital, New York, New York. Pathology of marine animals.

DR. GEORGE H. FRIED, Beth Israel Hospital, New York, New York. Enzymology of pinnipeds and fishes.

DR. ALBERT S. GORDON, Department of Biology, Graduate School of Arts and Science, New York University, New York, New York. Comparative hematology.

DR. ROBERT W. HARRINGTON, JR., Entomological Research Center, Vero Beach, Florida. Hermaphroditic *Rivulus*.

DR. MILAN J. KOPAC, Department of Biology, Graduate School of Arts and Science, New York University, New York, New York. Cyto- and histochemistry of melanomas in platyfishes.

DR. WILLIAM J. KUHNS, Department of Pathology, New York University School of Medicine, New York, New York. Comparative serology of fishes.

DR. L. EDGAR LEE, Department of Pathology, Yale University, New Haven, Connecticut. Diseases of fishes, generally; electron-micrographic studies of trout liver tumors and papillomas in the Bahamian slippery dick.

DR. WILLIAM MEDWAY, Department of Clinical Pathology, School of Veterinary Medicine, University of Pennsylvania, Philadelphia. Blood studies in Cetacea.

DR. ROBERT R. MILLER, Museum of Zoology, University of Michigan, Ann Arbor. Gynogenesis in fishes.

DR. P. M. POWLES, Fisheries Research Board of Canada. Epizootics of Ichthyosporidiosis in yellowtail flounders from the North Atlantic.

DR. DONN E. ROSEN, American Museum of Natural History, New York, New York. Genetics and evolution of *Xiphophorus*.

DR. MICHELE SARA, Director of the Institute of Comparative Zoology, University of Bari, Italy. Collection, identification, and biochemistry of sponges.

WILLIAM E. SCHEVILL, Woods Hole Oceanographic Institution, Massachusetts. Bioacoustics of marine mammals.

Dr. R. Jack Schultz, Department of Zoology, University of Connecticut, Storrs. Gynogenesis in fishes.

Edna Stein, Senior Bacteriologist, Coney Island Hospital, New York, New York. Microbiology of marine animals.

Dr. Horace Stunkard, American Museum of Natural History, New York, New York. Protozoan and helminthic parasites of fishes and marine mammals.

Dr. Henry Vogel, Bureau of Laboratories, Department of Health, New York, New York. Continuation of research on Salmonella and other terrigenic disease-producing bacteria in fishes and in marine mammals.

GRADUATE STUDENTS

The following students, sponsored by Dr. Nigrelli, received advanced degrees from New York University Graduate School of Arts and Science.

Ph.D.

Erwin Ernst, The distribution, ecology and environmental behavior and possible hybridization of the sea stars *Asterias forbesi* (Desor) and *Asterias vulgaris* Verrill in the subtidal zone of Long Island.

George C. Hill, The structure and function of Mitochondria in *Crithidia fasciculata.*

Vincent R. Liguori, A comparative study of bacterial extracts by zone electrophoresis on polyacrylamide gels, with special reference to the marine pseudomonad, *Pseudomonas piscicida,* an ichthyotoxic species.

M.S.

Harry A. Birnbaum, M.D., The fish adrenal cortical homolog and preliminary studies in experimentally induced arteriosclerosis.

Robert Ferone, Folate cofactor biosynthesis by *Plasmodium bergagi.* Comparison of folate and dyhydrofolate substrates.

Ph.D. Candidates

Betty Jane Lasley, Effects of Holothurin on leucocyte motility and phagocytic activity.

Joseph F. Sayegh, Experimental steroidogenesis in fishes.

Peter Squicciarini, Experimental studies on inflammatory reactions in fishes.

George F. Wendt, Studies on tissue mix in the branchial arches of fishes.

M.S. Candidates

Jonathan E. Amson, The effects of increased pressures of nitrogen on certain teleosts.

William G. Lillis, Larval helminthic parasites of fishes and their experimental transmission in birds and mammals.

Joseph V. Chuba, Comparative serology of fishes.

FORDHAM UNIVERSITY, GRADUATE DEPARTMENT

Ph.D. Candidate

Norman F. Cates, Studies on interrelated metabolism of Zooxanthellae and the tissues of sea anemones.

Graduate Students-in-Training

Cheung, Paul J.	New York University
Fay, Florence	C. W. Post College, Long Island University
McGinn, Marian Patricia	Fordham University
O'Melia, Anne F.	Fordham University
Shimony, Tamar	New York University

GENERAL ACTIVITIES

INSTITUTE FOR RESEARCH IN ANIMAL BEHAVIOR AND THE WILLIAM BEEBE TROPICAL RESEARCH STATION

DONALD R. GRIFFIN, *Director*

THE PAST YEAR saw continued expansion of activities of the Institute. Increasing numbers of graduate students and postdoctoral fellows from The Rockefeller University have become actively involved in the joint program. The increased interaction between these research activities and the curators and collection of the Zoological Park has been particularly welcome. Remodeling of the upper part of the Bay Tree House and the Greenhouse-Aviary complex has increased research space and facilities substantially. Dr. Fernando Nottebohm, who took his doctorate in animal behavior at the University of California in Berkeley, joined us at the beginning of the year as Research Zoologist and Assistant Professor at The Rockefeller University. In late March, O. Marcus Buchanan arrived in Trinidad to start work as Resident Director of the William Beebe Tropical Research Station.

Dr. C. Alan Lill also arrived at the Beebe Station to begin research on the social behavior of manakins.

PERSONNEL AND RESEARCH

Dr. Griffin and Dr. Jeremy Hatch have flown little brown bats in an experimental wind tunnel for continuous periods as long as 12 minutes. The first version of a tapering flight chamber worked as we had hoped — allowing a bat to fly at varying airspeeds without escaping upwind or drifting back to the downwind end of the flight chamber. Measurements of the directional pattern in which ultrasonic orientation sounds are emitted by bats were made by means of multiple, calibrated microphones. An enlarged and improved wind tunnel has been constructed, largely through the work of Robert Brown and Steven Spencook. It contains not only the tapering flight section of the first model but an enlarged cage area both upwind and downwind in which the bat or bird can fly with less effort and land in areas of slower air speed.

Mr. Jack Bradbury is continuing his thesis work on the echolocation ability of *Vampyrum spectrum,* the largest of the insectivorous bats. The question under examination is whether or not these bats are able to distinguish between targets that return nearly identical echoes. In order to receive a food reward the bats must choose correctly between echoes which differ in the relative intensities of their component frequencies. It is impressive that some of the target pairs which these bats routinely distinguish reflect sounds so nearly identically that the differences have only recently been measured by the use of the most sensitive equipment. Careful analysis of stereoscopic motion pictures taken under infrared illumination combined with high-frequency tape recordings of the bat's orientation sounds shows the distance at which the bat makes its choice as well as differences in tempo or pattern of orientation sounds just prior to that moment.

During the early part of the year Mr. and Mrs. Tim Williams completed experiments on the homing of bats in Trinidad for Mr. Williams' Ph.D. thesis. Further refinements of radio transmitters for tracking bats and the use of two receivers — one at a release point, the other from one to five miles away — made it feasible to track bats on homeward flights for several miles under most conditions. A few especially favorable cases yielded enough information to plot entire homing tracks over distances as great as 10–15 miles. Dr. Jeremy Hatch has been using the wind tunnel for preliminary tests of how much weight a local species of bat, *Eptesicus fuscus,* can carry. He is interested in extending the sort of studies on radio tracking begun by Mr. Williams to these bats, which are known to have a pronounced homing ability, and which he has shown are able to home over distances of 10–15 miles during a single winter's night.

Dr. Peter Marler has continued study of the social behavior of the ruff in captivity with the help of Mrs. Inger Bradbury. Of the original group of six pairs of birds, all but one are surviving. As had been hoped, the males in the aviaries take up "lek" stations, which they defend against rivals. The curious social status of white-ruffed males, reported by field workers in Holland, recurs in captivity as long as the birds have enough space. Experimental analysis of this problem thus becomes feasible. A graduate student, R. Haven Wiley, worked with grouse, another group of birds showing lek behavior. Field study of the behavior of sage grouse in Wyoming was begun, with particular attention given to the structure of the lek. Movie photography holds great promise as a method for recording the complex interactions that occur. With specially constructed cages and diets, developed with the aid of the Bird Department, 18 birds of three species were kept successfully during the fall and winter. During a violent storm which turned one of the aviaries over we suffered our only loss. One prairie chicken which escaped was run over on the Bronx River Parkway.

After a stock of several species of cardueline finches had been accumulated, comparative study of their displays and vocalizations was begun. Techniques were developed for photographing movements of finches while taking flight, for comparison with actions of the same species in display. Dr. Paul Mundinger, who joined Dr. Marler on a postdoctoral fellowship after work at Cornell University and Miami University, studied the behavior of goldfinches and siskins. He has found that American goldfinches form a stable pair bond in the spring. Apparently the male and female modify their flight calls at this time to resemble each other; the flight calls permit the birds to keep in contact for the rest of the breeding season. Dr. Mundinger's work confirms the recent suggestion by Dr. W. H. Thorpe in England that the most widespread function of vocal imitation in birds may be to permit minor changes in their calls that serve to cement the bond between pairs of breeding birds.

The first phase of a long study of song development in the white-crowned sparrow was completed with five birds raised by hand in acoustical chambers and trained with recorded song at various stages of development, further exploring the role of learning in song development in this species.

Work with primates continues to expand. Field work in Uganda by graduate students Steven Green and others on the behavior of black and white colobus monkeys reveals almost classical territoriality in this species, which is unusual among primates. Colobus monkeys resemble gibbons both in this respect and in the small size of the home range which a troop occupies, which is less than 1/10 of a square mile. They differ from gibbons in the larger size of the troop, the typical composition of which would be one adult male, four adult females, two subadult animals, and one infant. With the help of graduate student Richard Zigmond, ten weeks were spent in Tanzania on a joint field study with Jane and Hugo van Lawick on communication in chimpanzees. Many tape recordings of sounds were made in all kinds of social interactions from known individuals. With the support and cooperation of the National Geographic Society extensive motion picture footage was taken with synchronized sound recordings. We hope these will enable us to answer many questions about the ways in which gestures and sounds are combined in the signaling behavior of this species.

In December Miss Jocelyn Crane made a brief trip to Cali, Colombia, to study the remarkable local race of the butterfly *Heliconius erato,* which has solid black wings. Throughout the rest of its wide neotropical range the wings have bright red markings which are a crucial signal during courtship. Males of the Cali race find the females by some nonvisual means, almost certainly by scent, rather than relying upon flight and color as they do elsewhere throughout the range. It is of great interest that such a prominent feature of courtship can disappear from a local population during such a relatively short period of isolation, particularly when that isolation has otherwise produced such minor morphological modifications.

During the summer of 1967 Dr. Yveline LeRoy from the University of Paris worked at the William Beebe Tropical Research Station in collaboration with Miss Crane. Dr. LeRoy had previously analyzed the social communication behavior of crickets, and at Simla she concentrated on the highly diversified long-horned grasshoppers of the superfamily Tettigoniodea. A new type of sound production was discovered in which the male of one species knocks his abdomen against whatever vegetation or other surface he is standing on. In some species, males produce sounds in "chorus" with what appears to be a leader. If the "leader" ceases to produce sound the chorus ends. In one particularly interesting case of aggressive behavior (*Vestria*) an abdominal gland can produce a drop of sticky orange liquid with an unpleasant odor which is spread around during a fight. Certain species show pronounced mimicry of leaves or other vegetation, and these seem less prone to intraspecific aggressive behavior.

Dr. C. Alan Lill was engaged in field study in Trinidad on behavior of the black and white manakin at the lek and on the social organization of grass finches, especially the glossy grassquit, the most common finch in Trinidad. He has confirmed the polygynous and promiscuous nature of mating in the manakin, which is clearly nonrandom. Only eight of 17 males mated, and only a few of these with any frequency. One male performed nearly half of all the matings seen. Dr. D. W. Snow at Simla between 1956 and 1961 banded some of these birds.

Several have been retaken and are between 7 and 10 years old, a considerable age for a small bird in the wild.

Dr. Fernando Nottebohm continued analyzing the development of song in the European chaffinch. He demonstrated that the critical period for song learning in a male of this species is not age-dependent in the usual sense. A field study of the song of the South American chingolo, a relative of our white-crowned and white-throated sparrows, revealed an elaborate pattern of dialects that seem to correlate with the habitats occupied by different populations of this widespread species. Dr. Nottebohm has become convinced that the dialects play some role in keeping local populations of this species apart.

Dr. Roger S. Payne has largely spent this year planning a new research project and developing apparatus for it. The project involves a study of the behavior of whales at sea. Dr. Payne hopes eventually to study a herd of sperm whales by staying with it for extended periods. He hopes he will learn something about the social communication and echolocation of sperm whales as well as finding out something about how they navigate during long migrations. Dr. Payne will carry out simple analyses of the ordering of individual sounds during long bouts of vocalizing by solitary whales as well as by groups of whales. This may help reveal how complex the structure of whale communication actually is. Dr. Payne will also try to correlate vocalizations with other behavior to find out what various sounds signify.

During the winter and spring of 1967 the Adelie penguins brought by Dr. Richard Penney from Antarctica during the fall of 1966 continued to thrive; three young birds that hatched after arrival have grown to adult size and appear in excellent health. Training and conditioning procedures for penguins have led to development of a special apparatus. It consists of a cylindrical chamber, which has a number of short levers protruding from its inside well. Each lever is located close to a small light. Penguins have learned that if they press the lever closest to a light, they will receive a piece of fish. Two young birds have responded to direction training under the artificial sun in the laboratory. One of these young birds has never seen the natural sun before, and the other has observed it only during the first six weeks of the bird's life in Antarctica. Within two or three training trials the young penguins showed a preference for levers yielding a food reward in the direction of the sun. Random rotation of the testing chamber showed that the birds were in fact using the sun as their orientational cue. When tested for orientation at a different time of day their orientation was still toward the sun. This shows that they were not compensating for the motion of the sun, but exhibited constant sun-angle orientation instead of the time-compensated or sun-compass orientation observed by Dr. Penney in field studies.

Dr. George Schaller has now tagged 135 lions on the Serengeti plains. Two hundred and sixty-eight prey animals, mostly wildebeest, Thomson's gazelles, and zebras, were identified. Although two-thirds of the prey animals were killed by the lions themselves, it is interesting to discover that as many as one-fourth of them were scavenged from hyenas, cheetahs, and wild dogs. Three lions were tracked by radio telemetry, one for 21 consecutive days, covering about 75 square miles. This adult male ate seven times during the 21 days, either by joining other lions on their kill or by scavenging from hyenas or leopard. He hunted only once himself, in an unsuccessful chase after a dik-dik. Comparative observations were also made on the cheetah.

On the slopes of Mount Cameroon in West Africa, at one of the wettest places on the earth's surface, Dr. Thomas Struhsaker studied the behavior and ecology of several West African primates, including the drills and several species of Cercopithecus monkeys. He was joined in September by Dr. J. S. Gartlan, on leave from the University of Bristol and the Medical Research Council of England. An understanding of the ecological niche separation among the Cercopithecinae of the rain forest has begun to emerge. *C. mona* clearly dominates the mangrove forest and is much more prevalent in young secondary growth than in mature forests. It is seen in all vertical strata of the forests where it occurs. *C. pogonias* is more common in mature forests and is much less abundant or missing altogether from young secondary forests. Sounds of many species have been recorded, and some were played back through portable equipment to determine the response of wild animals to the sounds, thereby demonstrating their function in social communication.

WILLIAM BEEBE TROPICAL RESEARCH STATION

The following scientists worked at the Beebe Station for short periods: Mr. and Mrs. Ray Coppinger from Amherst College collected butterflies and birds for Dr. Brower's research program, which includes major phases both in Trinidad and in Amherst, Mass. Dr. and Mrs. Alfred C. Redfield from the Woods Hole Oceanographic Institution studied the ecology of Trinidad during a brief visit in February. Dr. Hubert Markl, University of Frankfurt, Germany, worked out plans for future research work in Trinidad.

Six biologists visited Simla while traveling to or from the expedition of the University of California research ship *Alpha Helix,* which is spending about a year in the Amazon River and serving as a floating laboratory for a number of experimental biologists. These included Dr. Alan Steinbach from The Rockefeller University, Dr. Per F. Scholander, Dr. Nobuo Suga, and Dr. R. B. Livingstone from the

University of California, San Diego, and Dr. Donald Lindsley, University of California, Los Angeles.

Dr. C. G. Bernhard, Karolinska Institute, Stockholm, worked for a few days collecting insects for his investigations of the fine structure of the compound eye and in order to plan possible future work at Simla next year. Dr. Charles Collins, the American Museum of Natural History, continued and extended his studies of swifts in Trinidad. From the Zoological Park, Allen Vinegar worked on the amphibians of Trinidad for about two weeks in April; and in June, William Conway and Joseph Bell succeeded in collecting living oil birds in Trinidad.

Scientists who spent the summer doing research at Simla are listed below:

Dr. Lincoln P. Brower and Dr. Jane Brower from Amherst, Dr. Laurence Cook from Manchester University, England, and three students from Amherst College began a fascinating new type of behavioral and biological research involving both butterflies and the food plants on which their larvae feed. Milkweeds contain poisonous substances which become incorporated into the caterpillars that feed upon them; and this determines how distasteful the larvae will be to predatory birds. Dr. Brower and his colleagues have recently discovered that there is a wide variation in the actual amount of poisonous substances present in milkweeds and related plants. Thus the same species of caterpillar may feed on a given species of milkweed in different geographical areas and become more or less distasteful or even poisonous, depending on the biochemistry of the particular local flora on which it feeds. This undoubtedly explains much of the confusing variability in the responses of birds to insects with warning coloration. In one region the birds may have learned that a given pattern marks a very bad-tasting insect, while in other regions that same insect may be quite palatable. These discoveries also add a new dimension of complexity to the interrelated phenomena of mimicry and predatory behavior and they have added very significantly to our understanding of the whole phenomenon of mimicry.

Dr. Swihart from the State University College, Fredonia, New York, continued his neurophysiological studies of insect sensory systems. The Swihart group studied the large nerve fibers found in the central nervous system of Satyrid butterflies, which respond to very strong sensory stimuli whether these be visual or tactile. As in other invertebrate animals, such “giant-fiber systems” seem to be involved in the rapid responses to unusually strong stimuli that, under natural conditions, probably tend to imply danger for the animal. The general conclusion of this summer’s work is that the visual areas of the brains of butterflies are proving to bear a striking resemblance to visual systems of vertebrates.

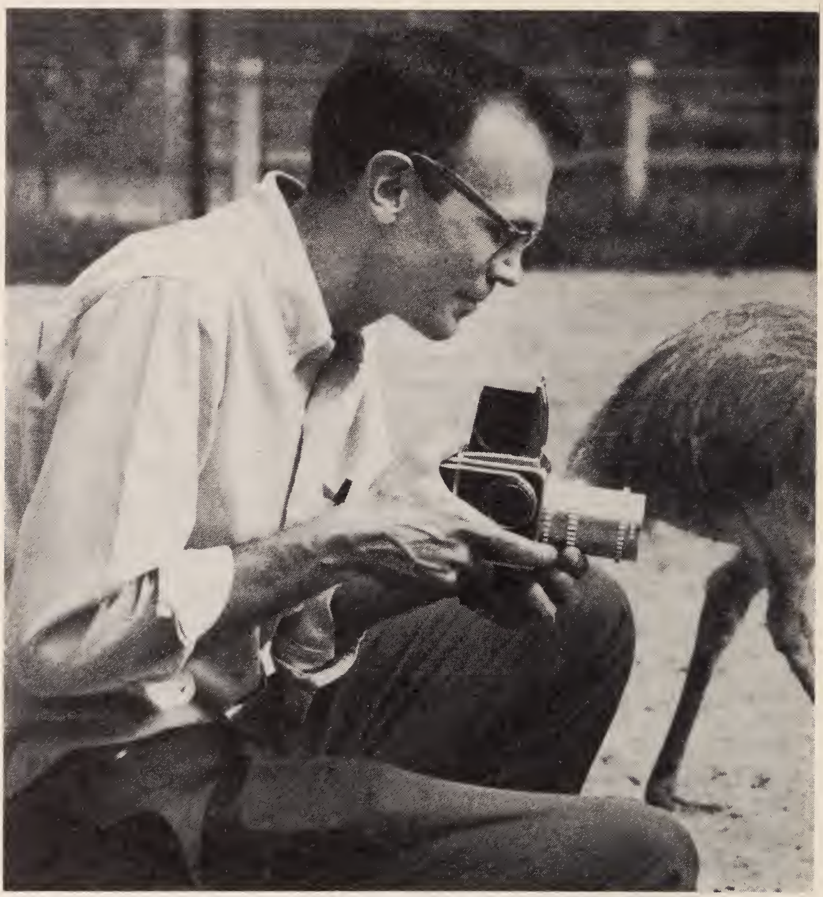
Dr. Roderick A. Suthers and his two student associates from Indiana University have shown that many of the neotropical bats have better visual responses than was previously suspected. Blindfolding had no effect on the ability of two species of leaf-nosed bats to avoid obstacles and ear plugs did impair the bats' obstacle avoidance. But bats that were both blindfolded and temporarily deafened were still more disoriented. Evidently the eyes are of some aid in detecting conspicuous obstacles when hearing is impaired.

In addition to the necessity of devoting the bulk of his time to gaining familiarity with the complex operations of the station, O. Marcus Buchanan has also initiated preparations for research on the natural history, ecology, and behavior of macaws and some of the more abundant species of bats.

EDUCATIONAL CONTRIBUTIONS

In the course of the year 11 Rockefeller University graduate students were engaged in research under the direction of staff members of the Institute or in another laboratory where, as in two cases, arrangements were made to accommodate them. For example, one of them, who is primarily concerned with biophysics and cellular physiology of vision, spent the summer observing gulls at the Rutgers University field station in New Jersey. His interest in animal behavior is continuing, although it is secondary to his main laboratory experiments. Two more, engaged in research on developmental biology and virology, gained experience in field work on animal behavior in East Africa under the direction of Dr. Marler. The third student on this project, the behavior of black and white colobus, is doing thesis research on primate behavior. Several other thesis candidates have been mentioned in the preceding pages.

It is abundantly clear that our joint program with The Rockefeller University has drawn several able, young biologists into the field of animal behavior. Six are now definitely planning to write their Ph.D. thesis under the guidance of research zoologists who also hold faculty appointments at The Rockefeller University. Several others are distinctly interested and have either undertaken minor projects or expressed strong interests in future developments. In addition, graduate students continued to work at the William Beebe Tropical Research Station in Trinidad. Thus the Institute for Research in Animal Behavior is having a wider and more profound impact on numerous graduate students who are likely to become leading teachers and investigators in future years.



PUBLICATIONS AND PUBLIC RELATIONS

EDWARD R. RICCIUTI, *Editor and Associate Curator*

DOROTHY REVILLE, *Photo Librarian*

ELYSBETH H. WYCKOFF, *Production Editor*

SAM DUNTON, *Photographer*

WILLIAM MENG, *Photographer*

TWO ADDITIONS to the personnel roster, continued drift by *Animal Kingdom* away from a house organ format, and a change in departmental name which reflects increased emphasis on public relations marked 1967 for the Department.

John Miller left his position as head of the Department to return to broadcast journalism on June 9. He was succeeded by the present Associate Curator, Edward R. Ricciuti, who joined the Department on May 15.

The increasingly active public relations effort mounted by the Department has resulted in a change in departmental designation – made late in the year – from Publications and Photography to Publications and Public Relations.

The assistance of a new Production Editor, Miss Elysbeth Wyckoff, has enabled Mr. Ricciuti to devote more time to establishing a positive public relations program.

ANIMAL KINGDOM

Animal Kingdom continued its growth toward becoming a magazine of national zoo-aquarium interest, a new direction first undertaken by Mr. Miller and reinforced by Mr. Ricciuti. An increase in article payment rates to a maximum of $250, plus additional payment for photos, helped bring in a variety of articles. Outside authors included authorities from other zoos, noted scientists, and some leading writers of popular science and nature material. A highlight was publication in the October issue of an article, "Wildlife Fights for Survival," by Stewart L. Udall, United States Secretary of the Interior.

With the June issue, a new feature was added to the magazine to replace the "Behind the Scenes" section. Headlined "Animal Kingdom Reports, News of Zoos, Aquariums, and Conservation," the section is designed to bring readers information on developing topics in the areas mentioned. Content of this section has been heavily laced with reports on such Society activities as the opening of the Osborn Laboratories of Marine Sciences and the hatching of a scarlet ibis at the Zoo. However, it also carried news about other zoos, government conservation and wildlife efforts, and wildlife. Another new feature started in 1967 is the inclusion of a map on the inside back cover which shows road directions to various zoos and aquariums. Favorable comment has been received from several other institutions on this service.

A total of 10,500 copies of *Animal Kingdom* were printed for the final issue of 1967, as compared to 9,200 for the previous December. Members accounted for 6,718 of the total; nonmember subscriptions, 2,257. We sent 425 copies of the December issue by bulk to the Seattle Zoological Society.

OTHER PUBLICATIONS

The Department, with the cooperation of the Department of Exhibition and Graphic Arts, published a major booklet on the Society's work in wildlife protection, written by Dr. Osborn. The booklet, "Yesterday, Today & Tomorrow," covered Society programs around the globe.

With the publication of a combined Fall–Winter issue of *Zoologica* in December, the journal was placed on a satisfactory production schedule. Kraus Reprint Corporation purchased all back stock of *Zoologica* through Volume 49. We continue to maintain stocks of volumes beginning with Volume 50, published in 1965.

The Department also worked with the Department of Exhibition and Graphic Arts on publication of a booklet about the Osborn Laboratories of Marine Sciences. The Department of Exhibition and Graphic Arts has also assisted in improving *Animal Kingdom* by providing design services.

PUBLIC RELATIONS

Activity in this area was spread largely between newspapers and television, with slightly more effort devoted to the latter. We provided assistance to television personality Murray the K in producing a portion of a television musical special on New York City. Part of the program was taped at the African Plains. The effort expended in terms of personnel and facilities makes it questionable whether similar efforts would be advisable. The effort expended by this and other departments was extensive – the project was a baptism by fire for the new Associate Curator and led to some revisions in public relations procedure.

A press day for science writers was held at the Osborn Laboratories of Marine Sciences for representatives of newspapers, a wire service, and science-medical magazines.

The arrival of striped dolphins and beluga whales at the Aquarium, the pelican roundup, and the weighing of large snakes at the Zoo received generous coverage.

A major public relations project begun this year should bear fruit in 1968. The effort is an attempt to expand contacts with all local media and some new national media.

The Department worked with others on the film, "Adventure in Learning," shown at the Annual Meeting.

PERSONNEL

Miss Wyckoff assumed the position of Production Editor on September 18 and is now responsible for all publication production duties.

In May Richard Larsen and the print shop operations were transferred from this Department to the Department of Exhibition and Graphic Arts. Miss Helen O'Brien was employed on a temporary basis to assist in photo darkroom work.

TRAVEL

Mr. Ricciuti accompanied the airlift which brought two female belugas from Churchill, Manitoba, to the Aquarium. He handled public relations for the event and described the whaling expedition in an *Animal Kingdom* article.

MISCELLANEOUS ACTIVITIES

During the year, in-park sale of publications at the Associate Curator's office was discontinued. Mail order sales, which require considerable time and effort, are still handled through the Department.

PHOTOGRAPHY AND PHOTO LIBRARY

Photographic efforts for the year have been largely involved in producing new animal photographs for the Society's forthcoming Zoological Park publication: *The Bronx Zoo Book of Wild Animals.* For possible illustration-use in this new publication, photographers Sam Dunton and William Meng photographed 234 species of animals, adding 1,261 color transparencies and 3,448 black-and-white negatives to the Society's permanent photo collection.

The format of this new Zoo Book will be much larger in size than previous Zoo guidebooks and, as presently planned, will contain approximately 300 pages of text and several hundred photographic illustrations – many in color. William Bridges, who retired as Curator of Publications in 1966, is writing the text for the new guide. When published, it will replace the present Guide book, which was published in 1939.

Several weeks of photographing at the Aquarium produced color transparencies for the Aquarium's exhibit labels; also, a complete series of black-and-white and color photographs was taken of the interior and exterior of the Osborn Laboratories of Marine Sciences and the Aquarium's exhibits and facilities. In addition, several hundred feet of outstanding movie footage showing male sea horses ejecting young from their brood pouches was photographed.

Requests from commercial publishers for Society photographs increase with each passing year. Over 2,000 photographic prints were supplied to book, magazine, and newspaper publishers for possible publication use.

MEMBERSHIP

GORDON CUYLER, *Membership Chairman*

THE MEMBERSHIP year began with the annual meetings at the Waldorf-Astoria on the evenings of January 11 and 12. About 3,600 members and guests attended. The motion picture program was highlighted by an extraordinary film, "In the Village of the White Storks" by Heinz Sielmann.

In the spring, six events for members on Saturday mornings were scheduled. These included three programs designed for youngsters and three tours, conducted by Curators, planned for adults. This year's garden party, which featured a camel race and animal parade, drew a large number of members.

The Society's principal means of enrolling new members continues to be through direct mail. Newsletters provide a good mailing piece to attract new members. In 1967, a newsletter about activities in the Zoo and Aquarium was mailed in April, and an unusual and stimulating newsletter, "Communication in Wild Chimpanzees" by Dr. Peter Marler of the Institute for Research in Animal Behavior was mailed in October.

Chiefly due to these newsletters, 1,015 new members enrolled in 1967. Our membership total at the end of the year was 6,718, a net gain of 409 members over 1966. Membership income, because of new enrollments and increased contributions from members who changed their memberships to higher categories, increased about $14,000 over 1966 to a record $130,155.

JACKSON HOLE BIOLOGICAL RESEARCH STATION

L. Floyd Clarke, *Director*

A very successful activity program at the Research Station this past summer included:

Seminars and talks by visiting scientists, participation in a school for Park administrators, participation in the Student Conservation Program, participation in two programs for high school biology students, and the following research investigations.

Margaret Altman — A comparative study of interspecies communications. Supported by University of Colorado.

Joseph T. Bagnara — Developmental physiology of amphibian pigmentation. Supported by National Science Foundation.

John W. Baxter — Rust fungi of the western United States and Mexico. Supported by National Science Foundation.

Alan A. Beetle — Trends in vegetation in Teton County, Wyoming. Assisted by Mat Terry. Supported by Wyoming Natural Resource Board, Teton National Forest Permittees Association, and Wyoming Agriculture Experiment Station.

William A. Calder — Physiology of diving and breath-holding in small birds and mammals. Supported by National Institues of Health and Virginia Polytechnic Institute.

Howard E. Evans — Study of digger wasp communities along the Snake River. Supported by the Museum of Comparative Zoology, Harvard University.

William R. Good — Study of drifting insects in the Snake River. Supported by National Park Service.

Henry Huizinga — Study of chromosomes in some mammals of the area. Supported by New York Zoological Society and University of Wyoming.

Kent H. McKnight — Fleshy fungi of Yellowstone and Teton National Parks. Assisted by Mrs. McKnight, who prepared illustrations. Supported by United States Department of Agriculture.

James Mulligan — Comparative studies of song sparrow vocalizations. Assisted by Thomas Cooper. Supported by National Science Foundation.

Martin A. Piehl — Studies of hemiparasitic and parasitic flowering plants. Supported by New York Zoological Society.

William J. L. Sladen — Population dynamics and social behavior of swans.

Dale L. Taylor — Biotic succession in lodgepole pine forests of fire origin in Yellowstone National Park. Supported by New York Zoological Society and Wyoming Chapter of Sigma Xi.

The following are research projects supported by the National Park Service under the Student Conservation Program:

W. Brenton Costain — Biotic succession in lodgepole pine communities of fire origin in Yellowstone National Park.

Marilee Hylant — Techniques and uses in the study of mammalian chromosomes.

Susan Jane Noble — A study of the variability in five species of *Castilleja* in the vicinity of the Station.

Cleo C. Pierre — A comparative study of the nesting behavior of two species of digger wasps.

FINANCIAL STATEMENTS

EXHIBIT A

NEW YORK ZOOLOGICAL SOCIETY

BALANCE SHEET • December 31, 1967

CURRENT FUNDS

ASSETS

General

Cash		$ 641,631.74
Accounts receivable:		
City of New York	$ 492,044.72	
Other	24,389.83	516,434.55
Inventories, at cost		14,166.22
Prepaid expenses and deferred charges		47,907.92
Due from endowment and funds functioning as endowment		146,615.86
Total general		$ 1,366,756.29

LIABILITIES AND FUND BALANCES

General

Accounts payable and accrued expenses			$ 373,992.57
Due to unexpended land, buildings, animals and equipment funds			988,046.42
Fund balances:			
Appropriations for special purposes (Exhibit C)		$ 2,311.32	
Unappropriated:			
Balance at beginning of year	$49,481.73		
Decrease during year (Exhibit B)	47,075.75		
Balance at end of year		2,405.98	
			4,717.30
Total general			$ 1,366,756.29

ASSETS

Restricted

Cash	11,500.00
Grants receivable – United States Government	89,179.53
Inventories – visitor facilities, at cost	37,951.45
Other	5,784.32
Due from endowment and funds functioning as endowment	573,849.79
Total restricted	$ 718,265.09

LIABILITIES AND FUND BALANCES

Restricted

Accounts payable and accrued expenses	3,821.55
Due to unexpended land, buildings, animals and equipment funds	21,779.38
Fund balances (Exhibit D)	692,664.16
Total restricted	$ 718,265.09

BALANCE SHEET, continued

LAND, BUILDINGS, ANIMALS AND EQUIPMENT FUNDS

ASSETS

Unexpended Funds

Investments (market value $69,417.00)—(note 2)	$ 38,627.11
Bonds on deposit — City of New York	209,556.20
Grants receivable	8,000.00
Due from current general fund	988,046.42
Due from current restricted funds	21,779.38
Due from endowment and funds functioning as endowment	715,013.56
Total unexpended	$ 1,981,022.67

LIABILITIES AND FUND BALANCES

Unexpended Funds

Accounts payable — City of New York	106,556.73
Fund balances (Exhibit E)	1,874,465.94
Total unexpended	$ 1,981,022.67

ASSETS

Equity in Land, Buildings, Animals and Equipment

Equipment — visitor facilities, at cost (note 3):	
Zoological Park	$ 671,620.15
Aquarium	49,158.09
	720,778.24
Less accumulated depreciation	342,334.65
	378,443.59
Other land, buildings, animals and equipment (note 3)	5.00
Total investment	$ 378,448.59

LIABILITIES AND FUND BALANCES

Equity in Land, Buildings, Animals and Equipment

Investment in land, buildings, animals and equipment (Exhibit F)	$ 378,448.59
Total investment	$ 378,448.59

BALANCE SHEET, continued

ENDOWMENT FUNDS AND FUNDS FUNCTIONING AS ENDOWMENT

ASSETS

Investments (market value $13,884,499.81)—(note 2)		$12,579,849.71
Note receivable		45,084.00
Total endowment funds and funds functioning as endowment		$12,624,933.71

LIABILITIES AND FUND BALANCES

Due to current general fund		146,615.86
Due to current restricted funds		573,849.79
Due to unexpended land, buildings, animals and equipment funds		715,013.56
Principal of funds:		
Endowment funds (Exhibit G)	$ 2,380,258.97	
Funds functioning as endowment (Exhibit G)	8,809,195.53	
		11,189,454.50
Total endowment funds and funds functioning as endowment		$12,624,933.71

See accompanying notes to financial statements.

EXHIBIT

SUMMARY OF FINANCIAL ACTIVITIES

Year ended December 31, 1967

Revenue:			
Fees and grants from governmental units:			
Appropriations from the City of New York			$ 1,533,555
Other governmental			247,039
Total governmental fees and grants			1,780,594
Other:			
Membership dues		$ 130,155.02	
Program service fees and grants:			
Admissions		299,480.90	
Foundation and private grants		81,204.58	
Other		35,170.90	
Income from visitor facilities (after deducting $1,186,905.44 of directly related costs and expenses):			
Zoological Park	$ 434,434.33		
Aquarium	67,277.74	501,712.07	
Investment income		606,774,97	
Miscellaneous revenue		72,316.53	
Total other			1,726,814
Support from the public — contributions:			
For current general purposes		531,077.47	
For current restricted purposes		170,411.77	
For acquisition of land, buildings, animals and equipment		850,017.34	
Total public support			1,551,506.
Total revenue and support			5,058,916
Deduct revenue and support limited by donors:			
Currently expendable, only as specified by agreement (Exhibit D)		2,470,122.98	
Construction and acquisition of land, buildings, animals and equipment (Exhibit E)		929,439.17	
Total limited support and revenue			3,399,562.
Revenue and support available to finance current general expenditures, carried forward			$ 1,659,354.

SUMMARY, continued

tal revenue and support available to finance current general expenditures, rought forward			$ 1,659,354.18
penditures:			
Program services:			
Educational animal exhibits:			
Zoological Park		$1,802,725.41	
Aquarium		479,038.25	
Separately budgeted research		688,155.03	
Conservation and other public services		92,621.21	
Public and professional education		165,511.96	
Total program services		3,228,051.86	
Supporting services:			
Management and general	$ 308,072.94		
Fund raising	20,453.25		
Total supporting services		328,526.19	
Major expenditures for land, buildings, animals and equipment		837,879.34	
Total expenditures		4,394,457.39	
penditures financed by special funds:			
Special purpose funds (Exhibit C)	28,688.68		
Current restricted funds (Exhibit D)	2,090.450.35		
Unexpended land, buildings, animals and equipment funds (Exhibit E)	837,879.34		
Funds functioning as endowment (Exhibit G)	291,912.31	3,248,930.68	
Expenditures financed by current general revenue and support			1,145,526.71
Excess of current general revenue and support over related expenditures			513,827.47
educt:			
Prior years' adjustment due to change in method of recording receivables – City of New York		26,434.31	
Transfer to unexpended land, buildings, animals and equipment funds (Exhibit E)		20,641.44	
Transfer to funds functioning as endowment (Exhibit G)		513,827.47	
			560,903.22
Decrease in unappropriated current general fund			$ 47,075.75

e accompanying notes to financial statements.

EXHIBIT C

STATEMENT OF CHANGES IN APPROPRIATIONS FOR SPECIAL PURPOSES

Year ended December 31, 1967

Balance at beginning of year	$ –
Appropriations from funds functioning as endowment	31,000.00
	31,000.00
Deductions to finance expenditures included in Exhibit B	28,688.68
Balance at end of year	$ 2,311.32

See accompanying notes to financial statements.

Exhibit D

STATEMENT OF CHANGES IN CURRENT RESTRICTED FUND BALANCES

Year ended December 31, 1967

	Balance at beginning of year	Add current revenue, expendable only as specified by agreement (Exhibit B)	Deduct		Balance at end of year
			To finance expenditures included in Exhibit B	Transferred to unexpended land, buildings, animals and equipment funds (Exhibit E)	
Educational animal exhibits:					
Zoological Park	$ 189,597.09	1,374,699.76	1,374,699.76	25,000.00	164,597.09
Aquarium	27,834.15	159,715.57	159,715.57	—	27,834.15
Total educational animal exhibits	217,431.24	1,534,415.33	1,534,415.33	25,000.00	192,431.24
Separately budgeted research:					
United States Government	134,562.37	201,223.26	246,838.52	—	88,947.11
Other	242,319.33	90,223.96	229,816.64	—	102,726.65
Total separately budgeted research	376,881.70	291,447.22	476,655.16	—	191,673.76
Conservation and other public services	137,396.90	177,955.62	75,071.21	—	240,281.31
Public and professional education	12,338.24	248.26	4,308.65	—	8,277.85
Visitor facilities	415,541.92	466,056.55	—	821,598.47	60,000.00
Total	$1,159,590.00	2,470,122.98	2,090,450.35	846,598.47	692,664.16

See accompanying notes to financial statements.

Exhibit E

STATEMENT OF CHANGES IN UNEXPENDED LAND, BUILDINGS, ANIMALS AND EQUIPMENT FUNDS

Year ended December 31, 1967

	Zoological Park animal acquisitions and improvements — financed by:				
	Net income from visitor facilities and admissions	*Contributions, appropriations and other sources*	*Aquarium acquisitions and improvements*	*Replacement of equipment for visitor facilities*	*Total*
Balance at beginning of year	$ 28,004.49	404,683.45	79,635.60	—	512,323.54
Revenue:					
Contributions	—	800,017.34	50,000.00	—	850,017.34
Admissions	64,713.50	—	—	—	64,713.50
Investment income	—	11,834.76	—	—	11,834.76
Sale of animals	—	2,873.57	—	—	2,873.57
Total revenue	64,713.50	814,725.67	50,000.00	—	929,439.17
Appropriations from other funds:					
Current general fund (Exhibit B)	—	14,000.00	2,000.00	4,641.44	20,641.44
Current restricted funds (Exhibit D)	703,013.21	111,963.04	—	31,622.22	846,598.47
Funds functioning as endowment (Exhibit G)	—	223,342.66	180,000.00	—	403,342.66
Total appropriations	703,013.21	349,305.70	182,000.00	36,263.66	1,270,582.57
Total revenue and appropriations	$ 767,726.71	1,164,031.37	232,000.00	36,263.66	2,200,021.74
Total balance, revenue and appropriations	795,731.20	1,568,714.82	311,635.60	36,263.66	2,712,345.28
Deduct amounts expended for land, buildings, animals and equipment	234,592.47	374,265.26	192,757.95	36,263.66	837,879.34
Balance at end of year	$ 561,138.73	1,194,449.56	118,877.65	—	1,874,465.94

See accompanying notes to financial statements.

EXHIBIT F

STATEMENT OF CHANGES IN INVESTMENT IN LAND, BUILDINGS, ANIMALS AND EQUIPMENT

Year ended December 31, 1967

Balance at beginning of year	$ 331,485.55
Add purchase of equipment	83,226.70
	414,712.25
Deduct current year's provision for depreciation	36,263.66
Balance at end of year	$ 378,448.59

See accompanying notes to financial statements.

Exhibit

STATEMENT OF CHANGES IN ENDOWMENT FUNDS AND FUNDS FUNCTIONING AS ENDOWMENT

Year ended December 31, 1967

Endowment Funds

	Balance at beginning of year	*Gains on disposal of investments*	*Balanc at end of year*
Income unrestricted:			
George F. Baker fund	$ 174,722.00	1,943.74	176,665
Mary Thurston Cockroft fund	61,525.53	689.72	62,215
Robert Jaffray fund	22,255.66	250.81	22,506
William Pyle Philips fund	16,250.63	175.56	16,426
Rockefeller fund	1,613,962.12	17,945.14	1,631,907
Jacob H. Schiff fund	170,410.07	1,893.58	172,303
Total unrestricted	2,059,126.01	22,898.55	2,082,024
Income restricted:			
Research – Madison Grant scientific research fund	84,708.32	940.52	85,648
Conservation and other public services:			
Grant fund for the protection of wildlife	39,591.09	438.91	40,030
Stokes bird fund	8,162.81	87.78	8,250
Animal purchases:			
Edward P. Casey fund	130,594.18	1,454.67	132,048
Cadwalader animal fund	31,905.00	351.13	32,256
Total restricted	294,961.40	3,273.01	298,234
Total endowment funds	$2,354,087.41	26,171.56	2,380,258

Funds Functioning as Endowment

Balance at beginning of year		$8,922,391
Add:		
Appropriations from current general fund (Exhibit B)	$ 513,827.47	
Gain on disposal of investments	99,231.26	613,058
Total balance and additions		9,535,450
Deduct transfers to:		
Current general fund (Exhibit B)	291,912.31	
Appropriations for special purposes (Exhibit C)	31,000.00	
Unexpended land, buildings, animals and equipment funds (Exhibit E)	403,342.66	
		726,254
Balance at end of year		$8,809,195

See accompanying notes to financial statements.

NOTES TO FINANCIAL STATEMENTS

(1) New York Zoological Society follows the practice of reporting on the use of resources by specific fund groups similar to the reporting practices of organizations in related fields. On the basis of these practices, no provision for depreciation has been made in operations.

Except for pledges receivable of approximately $50,000.00, which have not been recorded, the accompanying statements are prepared on the accrual basis.

Expenditures for land, buildings, animals and equipment have been charged to operations. However, only the equipment of the visitor facilities has been recorded as assets in the land, buildings, animals and equipment fund at cost. Other such assets are recorded in this fund at nominal value (see note 3).

(2) Investments are stated at cost or if acquired by gift are stated at values established by the Society's management as representing fair market value at dates of acquisition.

(3) Equipment of the visitor facilities in use at December 31, 1967 is reflected at cost and is being written off over its estimated useful life on a straight-line basis. Other land, buildings, animals and equipment of the Society, including, but not limited to, the following, are recorded at the nominal value of $5.00:

National collection of heads and horns,
  art gallery, library and sundry items
Collection of living animals
Coney Island real estate
Land and buildings made available by the
  City of New York

(4) The New York Zoological Society and the City of New York have agreed to construct an aquarium, as funds become available, at an estimated total cost (to be shared equally) of $7,100,000.00, of which the initial stage (of approximately $1,550,000.00) was completed May 31, 1957.

(5) There are two pension plans covering substantially all of the Society's full-time employees. The total pension expense for 1967 was $32,946.50. The Society's policy is to fund pension cost accrued, and no unfunded past service cost or unfunded vested benefits existed at December 31, 1967. The assets of the pension fund, which approximated $2,927,000.00 at December 31, 1967, are not recorded in the accompanying financial statements.

PEAT, MARWICK, MITCHELL & CO.
CERTIFIED PUBLIC ACCOUNTANTS
Seventy Pine Street
New York, New York 10005

THE BOARD OF TRUSTEES
NEW YORK ZOOLOGICAL SOCIETY:

We have examined the balance sheet of New York Zoological Society as of December 31, 1967 and the related summary of financial activities and statements of changes in fund balances for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances. It was not practicable to confirm accounts receivable from the City of New York, as to which we have satisfied ourselves by means of other auditing procedures.

In our opinion, except for the valuation of certain fixed assets as described in note 3 to the financial statements, the accompanying financial statements present fairly the financial position of New York Zoological Society, at December 31, 1967, the revenue, support from the public, expenditures and appropriations, and the changes in fund balances for the year then ended, in conformity with accounting practices followed by non-profit organizations in related fields (see note 1 to the financial statements).

PEAT, MARWICK, MITCHELL & CO.

June 10, 1968

THE PENSION FUND

(Founded by Andrew Carnegie)

STATEMENT OF CASH TRANSACTIONS

Year ended December 31, 1967

Balance at beginning of year:				
Investments (quoted market value $2,992,366.14)				$2,856,987.13
Uninvested balance of cash				31,168.62
				2,888,155.75
Receipts:				
Income from investments:				
Interest			$ 90,629.61	
Dividends			49,819.96	
			140,449.57	
Contributions by employees — regular			14,938.42	155,387.99
				3,043,543.74
Expenditures:				
Refunds on account of resignations			11,352.53	
Pension disbursements			94,865.35	
Death benefit disbursements			3,105.80	
Custodian fees			1,051.02	
Actuarial fees			7,550.00	117,924.70
				2,925,619.04
Net gain on investment transactions				1,640.62
	Value			
	Quoted market	Book		
Balance at end of year:				
Investments:				
Bonds	$1,809,854.07	2,115,629.33		
Preferred stocks	59,462.50	88,879.59		
Common stocks	1,081,811.00	684,004.45		
	$2,951,127.57		2,888,513.37	
Uninvested balance of cash			38,746.29	
				$2,927,259.66

PEAT, MARWICK, MITCHELL & CO.
Certified Public Accountants
Seventy Pine Street
New York, New York 10005

The Board of Trustees
New York Zoological Society:

We have examined the statement of cash transactions of The Pension Fund (founded by Andrew Carnegie) of the New York Zoological Society for the year ended December 31, 1967 and the supporting schedule of investments as of December 31, 1967. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

In our opinion, the accompanying statement of cash transactions for the year ended December 31, 1967, together with the aforementioned supporting schedule, presents fairly the results of recorded cash transactions of The Pension Fund of the New York Zoological Society for the year then ended and the assets of the Fund at December 31, 1967, on a basis consistent with that of the preceding year.

Peat, Marwick, Mitchell & Co.

April 16, 1968

PEAT, MARWICK, MITCHELL & CO.
Certified Public Accountants
Seventy Pine Street
New York, New York 10005

The Board of Trustees
New York Zoological Society:

We have examined the statement of the Principal Fund of the Permanent Wild Life Protection Fund for the year ended December 31, 1967, set forth below:

Amount due from New York Zoological Society		$ 1,708.33
Investments, at book value (quoted market value $213,976.00)		226,724.25
Principal Fund:		
Balance at beginning of year	$ 205,116.84	
Add net gain on disposal of investments	23,315.74	
Balance at end of year		$ 228,432.58

Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

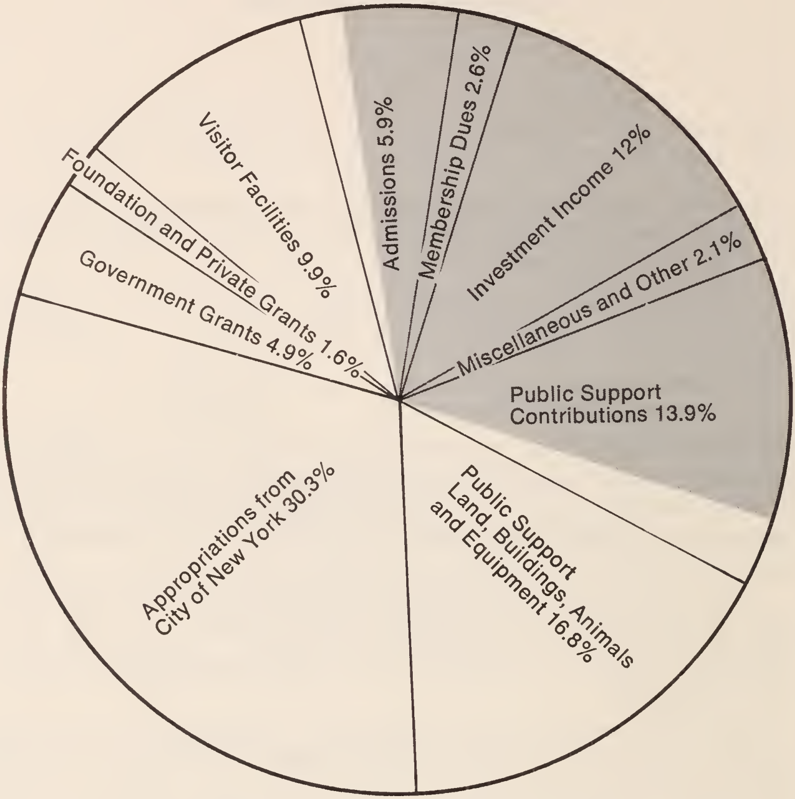
In accordance with the agreement establishing this Fund, the income from the investments of $10,629.40 was paid over to the New York Zoological Society to be used for the specific purposes set forth in such agreement.

In our opinion, the above statement of Principal Fund presents fairly the financial position of the Permanent Wild Life Protection Fund at December 31, 1967, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Peat, Marwick, Mitchell & Co.

April 10, 1968

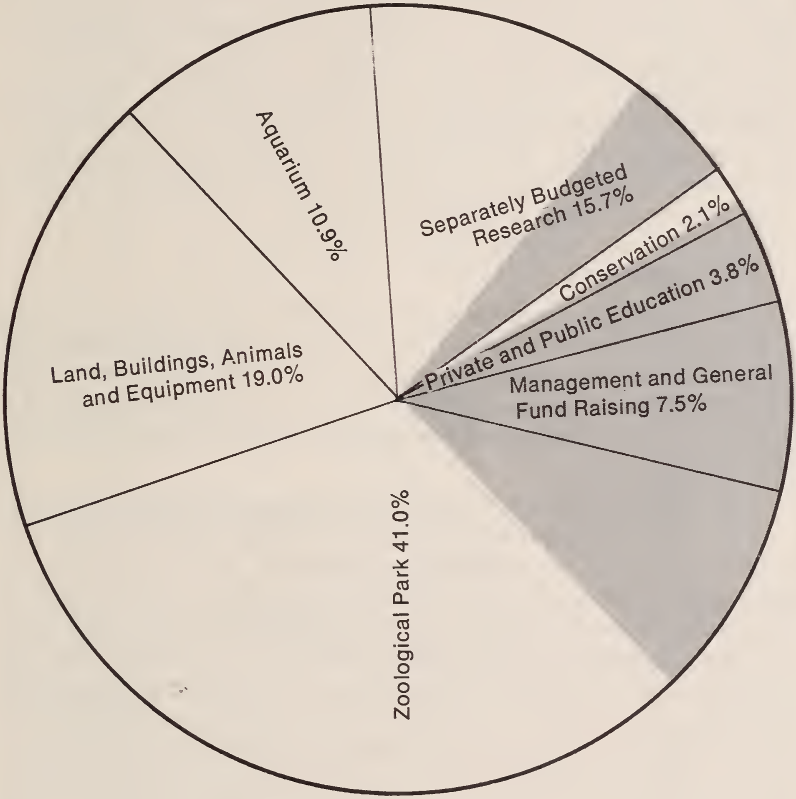
NEW YORK ZOOLOGICAL SOCIETY
YEAR ENDED DECEMBER 31, 1967
SUMMARY OF FINANCIAL ACTIVITIES



REVENUE AND SUPPORT— $5,058,916

☐ Support and revenue limited by donor or agreement.

▨ Support and revenue available for support of current activities.



EXPENDITURES—
$4,394,457

☐ Expenditures financed by special funds including $291,912 from Funds functioning as endowments for the support of operations.

▨ Expenditures financed by current support and revenue.

NEW YORK ZOOLOGICAL SOCIETY

INCORPORATION of the New York Zoological Society by the State of New York was accomplished under Chapter 435 of the Laws of 1895 and the basic purposes of the Society were embodied in Section 2:

> Said corporation shall have power to establish, maintain and control zoological parks, gardens, or other collections for the promotion of zoology and kindred subjects, and for the instruction and recreation of the people. Said corporation may collect, hold and expend funds for zoological research and publication, for the protection of wild animal life, and for kindred purposes, and may promote, form, and co-operate with other associations with similar purposes, and may purchase, sell, or exchange animals, plants, and specimens appropriate to the objects for which it was created.

Subsequently, at a special meeting of the Commissioners of the Sinking Fund, City of New York, held on March 24, 1897, a resolution was passed allotting South Bronx Park for the use of the New York Zoological Society and establishing the terms of a management agreement under which the Society has operated since that date, with only minor modifications.

The resolution of March 24, 1897, and the supplemental agreement of January 24, 1942, provided that the Society should furnish the original equipment of buildings and animals, that it should raise $250,000 by subscription within three years of the date of starting work on the improvement of the grounds, that the Society should have the right to establish an endowment fund to be used solely for the general uses and purposes of the Society unless otherwise specified by the donors, that the City of New York should provide funds for the maintenance and care of the Zoological Park and for the maintenance of the animal collections, that the Zoological Park should be open to the public free at least four days a week, that the Society may expend the net proceeds of facilities only for the purchase of animals and the improvement of the Zoological Park and that the Society should have the right to make and control all appointments of employees and to fix salaries and make promotions.

NEW YORK ZOOLOGICAL SOCIETY

Organized 1895

Presidents

I.	Andrew H. Green	1895 to 1897
II.	Levi P. Morton	1897 to 1909
III.	Henry Fairfield Osborn	1909 to 1925
IV.	Madison Grant	1925 to 1937
V.	W. Redmond Cross	1937 to 1940
VI.	Fairfield Osborn	1940

First Vice-presidents

I.	J. Hampton Robb	1895 to 1897
II.	Henry Fairfield Osborn	1897 to 1909
III.	Samuel Thorne	1909 to 1916
IV.	Madison Grant	1916 to 1925
V.	Frank K. Sturgis	1925 to 1932
VI.	W. Redmond Cross	1932 to 1937
VII.	Kermit Roosevelt	1937 to 1939
VIII.	Alfred Ely	1939 to 1959
IX.	Laurance S. Rockefeller	1959

Second Vice-presidents

I.	Charles E. Whitehead	1895 to 1902
II.	John L. Cadwalader	1902 to 1915
III.	Madison Grant	1915 to 1916
IV.	Frank K. Sturgis	1916 to 1925
V.	Henry D. Whiton	1925 to 1930
VI.	Kermit Roosevelt	1930 to 1937
VII.	Alfred Ely	1937 to 1939
VIII.	Laurance S. Rockefeller	1939 to 1959
IX.	Henry Clay Frick, II	1966
X.	Robert G. Goelet	1966

Honorary Vice-president

I.	DeForest Grant	1957 to 1960

Treasurers

I.	L. V. F. Randolph	1895 to 1901
II.	Charles T. Barney	1901 to 1903
III.	Percy Rivington Pyne	1903 to 1922
IV.	Cornelius R. Agnew	1922 to 1953
V.	David Hunter McAlpin	1953

Secretaries

I.	Madison Grant	1895 to 1925
II.	William White Niles	1925 to 1935
III.	Fairfield Osborn	1935 to 1940
IV.	Harold J. O'Connell	1941 to 1959
V.	G. W. Merck	1959 to 1964
VI.	John Elliott	1964

Chairmen, Executive Committee

I.	Charles E. Whitehead	1895 to 1896
II.	Henry Fairfield Osborn	1896 to 1903
III.	Charles T. Barney	1903 to 1907
IV.	Henry Fairfield Osborn	1907 to 1909
V.	Madison Grant	1909 to 1937
VI.	W. Redmond Cross	1937 to 1940
VII.	Laurance S. Rockefeller	1940 to 1943
VIII.	Fairfield Osborn	1943 to 1945
IX.	Laurance S. Rockefeller	1945

Directors

I.	William T. Hornaday	
	Zoological Park	1896 to 1926
II.	Charles H. Townsend	
	New York Aquarium	1902 to 1937
III.	W. Reid Blair	
	Zoological Park	1926 to 1940
IV.	Allyn R. Jennings	
	Zoological Park	1940 to 1941
V.	Charles M. Breder, Jr.	
	New York Aquarium	1937 to 1943
VI.	John Tee-Van	
	Zoological Park	1952 to 1956
	General Director, Zoological Park & Aquarium	1956 to 1962
VII.	Christopher W. Coates	
	New York Aquarium	1956 to 1964
VIII.	James A. Oliver	
	Zoological Park	1958 to 1959
IX.	William G. Conway	
	Zoological Park	1961
	General Director	1966
X.	Paul L. Montreuil	
	New York Aquarium	1964 to 1966
XI.	Ross F. Nigrelli	
	New York Aquarium	1966

BOARD OF TRUSTEES

City of New York
Ex-officio

Hon. John V. Lindsay, *The Mayor*
Hon. August Heckscher,
Administrator of Recreation and Cultural Affairs & Commissioner of Parks

Class of 1968

Charles W. Engelhard
Peter R. Gimbel
Robert G. Goelet
John N. Irwin, II
Warren Kinney
Peter Matthiessen
Charles W. Nichols, Jr.
Howard Phipps, Jr.
John Pierrepont
David T. Schiff
Chauncey Stillman
Landon K. Thorne, Jr.

Class of 1969

Robert E. Blum
William R. Coe
C. Suydam Cutting
Henry Clay Frick, II
Anthony D. Marshall
Otto Marx, Jr.
David Hunter McAlpin
G. W. Merck
Augustus G. Paine, II
John H. Phipps
Alfred G. Vanderbilt

Class of 1970

Alexander Aldrich
George F. Baker, Jr.
John Elliott
Robert I. Gannon, S. J.
Peter Grimm
Fairfield Osborn
Eben W. Pyne
Laurance S. Rockefeller
John M. Schiff
Henry Sears
Joseph A. Thomas
Robert Winthrop

OFFICERS OF THE SOCIETY

Fairfield Osborn, *President*

Laurance S. Rockefeller, *First Vice-President*

Henry Clay Frick, II, *Vice-President*

Robert G. Goelet, *Vice-President*

John Elliott, *Secretary*

Harold C. Palmer, *Assistant Secretary*

David Hunter McAlpin, *Treasurer*

Eben W. Pyne, *Assistant Treasurer*

General Office: 630 Fifth Avenue, New York, N. Y. 10020

EXECUTIVE COMMITTEE

Laurance S. Rockefeller, *Chairman*

George F. Baker, Jr.
John Elliott, *ex-officio*
Henry Clay Frick, II
Peter R. Gimbel
Robert G. Goelet
August Heckscher, *ex-officio*
John N. Irwin, II
David Hunter McAlpin, *ex-officio*
Fairfield Osborn, *ex-officio*
John Pierrepont

PENSION BOARD

Fairfield Osborn, *Chairman*

William G. Conway
John Elliott
Walter Lerchenfeld
David Hunter McAlpin
John McKew
Ross F. Nigrelli
John Pierrepont
Eben W. Pyne
William Souhrada

COMMITTEES OF THE SOCIETY

NOMINATING COMMITTEE FOR BOARD OF TRUSTEES

E. Roland Harriman, *Chairman*

Eli Whitney Debevoise
B. Danforth Ely

FINANCE COMMITTEE

Augustus G. Paine, *Chairman*

John Elliott
David Hunter McAlpin, *ex-officio*
Fairfield Osborn, *ex-officio*
Eben W. Pyne
John M. Schiff

AUDITING COMMITTEE

George F. Baker, Jr., *Chairman*

John Elliott, *ex-officio*
Fairfield Osborn, *ex-officio*
Howard Phipps, Jr.

EDITORIAL COMMITTEE

Fairfield Osborn, *Chairman*

William G. Conway
Lee S. Crandall
Hugh B. House
Donald R. Griffin
Edward R. Ricciuti
Ross F. Nigrelli
Peter R. Marler

HEADS AND HORNS COMMITTEE

Laurance S. Rockefeller
John Tee-Van*
Samuel B. Webb
F. Carrington Weems

*Died in 1967

STAFF

WILLIAM G. CONWAY, *General Director*
JOHN TEE-VAN, *General Director Emeritus, Zoological Park and Aquarium**

ZOOLOGICAL PARK

WILLIAM G. CONWAY, *Director & Curator, Ornithology*
CHARLES B. DRISCOLL, *Superintendent, Operations*
HUGH B. HOUSE, *Associate Curator & Chairman, Mammalogy*
ROLAND LINDEMANN, *Consultant in Mammal Management*
JOSEPH BELL, *Associate Curator, Ornithology*
DONALD F. BRUNING, *Ornithologist*
GRACE DAVALL, *Assistant Curator, Mammals & Birds*
DAVID W. NELLIS, *Mammalogist*
JAMES G. DOHERTY, *Mammalogist*
F. WAYNE KING, *Associate Curator, Herpetology*
CHARLES P. GANDAL, *Veterinarian*
GORDON CUYLER, *Membership Chairman & Administrative Associate*
HERBERT J. KNOBLOCH, *Curator, Education*
JERRY M. JOHNSON, *Curator, Exhibition & Graphic Arts*
EDWARD KEARNEY, *Manager, Facilities Department*
LEE S. CRANDALL, *General Curator Emeritus*
WILLIAM BRIDGES, *Curator of Publications Emeritus*

AQUARIUM

ROSS F. NIGRELLI, *Director*
NIXON GRIFFIS, *Administrative Assistant*
ROBERT A. MORRIS, *Curator*
LARS MELLKVIST, *Superintendent, Operations*
JEWELL BUNGAY, *Business Manager*
LOUIS MOWBRAY, *Associate in Field Biology*
CHRISTOPHER W. COATES, *Director Emeritus*

---

*Died in 1967

OSBORN LABORATORIES OF MARINE SCIENCES

ROSS F. NIGRELLI, *Director & Pathologist*
MARTIN F. STEMPIEN, JR., *Assistant to the Director & Research Associate, Bio-Organic Chemistry*
GEORGE D. RUGGIERI, S.J., *Coordinator of Research*
WILLIAM ANTOPOL, *Research Associate, Comparative Pathology*
C. M. BREDER, JR., *Research Associate, Ichthyology*
JACK T. CECIL, *Research Associate, Marine Virology*
HARRY A. CHARIPPER, *Research Associate, Histology*
KENNETH GOLD, *Research Associate, Radiation Ecology*
MYRON JACOBS, *Neuroanatomist*
KLAUS KALLMAN, *Fish Geneticist*
VINCENT LIGUORI, *Microbiologist*
JOHN J. A. MCLAUGHLIN, *Research Associate, Planktonology*
MARTIN P. SCHREIBMAN, *Research Associate, Fish Endocrinology*
EVA K. HAWKINS, *Algologist*

INSTITUTE FOR RESEARCH IN ANIMAL BEHAVIOR

[Jointly operated by the Society and The Rockefeller University, and including the Society's William Beebe Tropical Research Station, Trinidad, West Indies]

DONALD R. GRIFFIN, *Director & Senior Research Zoologist*
PETER R. MARLER, *Senior Research Zoologist*
JOCELYN CRANE, *Senior Research Ethologist*
ROGER S. PAYNE, *Research Zoologist*
RICHARD L. PENNEY, *Research Zoologist*
FERNANDO NOTTEBOHM, *Research Zoologist*
GEORGE SCHALLER, *Research Zoologist*
THOMAS T. STRUHSAKER, *Research Zoologist*
C. ALAN LILL, *Research Fellow*
O. MARCUS BUCHANAN, *Resident Director, William Beebe Tropical Research Station*

GENERAL

Walter Lerchenfeld, *Comptroller*
Bernard M. Fagan, *Accounting Manager*
John McKew, *Personnel Manager & Assistant to the Director, Zoological Park*
Edward R. Ricciuti, *Editor & Associate Curator, Publications & Public Relations*
Dorothy Reville, *Photo Librarian*
Sam Dunton, *Photographer*
Elysbeth H. Wyckoff, *Production Editor*
Henry M. Lester, *Photographic Consultant*

AFFILIATES

CONSERVATION FOUNDATION

Founded by
New York Zoological Society
in 1948

President
Russell E. Train

Chairman of the Board
Fairfield Osborn

Vice-chairman
Laurance S. Rockefeller

JACKSON HOLE BIOLOGICAL RESEARCH STATION

Founded by the New York Zoological Society in 1947 and under the sponsorship of the Society and the University of Wyoming

Director
L. Floyd Clarke

MEMBERSHIP IN THE NEW YORK ZOOLOGICAL SOCIETY

THE NEW YORK ZOOLOGICAL SOCIETY was founded in 1895 for the "instruction and recreation of the people" through the establishment of a Zoological Park, for the promotion of zoology through exhibition of collections, publications, research and exploration, and for the conservation of animal life of the world. Since 1899 the Zoological Society has directed the New York Zoological Park and in 1902 it was entrusted with the management of the New York Aquarium.

MEMBERSHIP is actively invited of all persons who are interested in the objectives of the Society and desire to contribute toward its support.

ANNUAL MEMBERSHIP is $15. Contributing Membership is $25. Supporting Membership is $100. These Memberships entitle the holders to Member's cards for admission (including parking) to the Zoological Park on pay days, and to the Aquarium on any day; 5 admission passes for guests to both the Zoo and the Aquarium; a copy of the *Annual Report;* a subscription to *Animal Kingdom,* the bi-monthly publication of the Society; privileges of the Library and Members' Lounge in the Administration Building of the Zoological Park and to attend all open meetings of the Society. Tickets to all sections of the Zoological Park for which an admission charge is made are available, free, to Members upon application at the Administration Building in person. Members will be taken on "behind the scenes" tours of the Zoological Park and Aquarium, without charge, on application, and are entitled to 20% discount on all publications of the Society. We are advised that Contributing and Supporting Membership fees are deductible from income tax within the legal limits.

LIFE MEMBERSHIP is $500. See By-laws for conversion of Annual, Contributing and Supporting to Life Membership. Other classes of membership are: Patron, $1,000; Associate Founder, $2,500; Founder, $5,000; Founder in Perpetuity, $10,000; Benefactor, $25,000.

APPLICATIONS for membership may be submitted to any officer of the Society at the Zoological Park or the Aquarium, or to the Society's general office at 630 Fifth Avenue, New York, N.Y. 10020.

FORM OF BEQUEST

I do hereby give and bequeath to the "New York Zoological Society," of the City of New York..............................

....

(For purposes of the Federal income tax, contributions to the Society, including a portion of membership dues, are deductible in an amount up to 30% of the donor's adjusted gross income. Bequests to the Society are deductible for Federal estate tax purposes).

FELLOWS OF THE NEW YORK ZOOLOGICAL SOCIETY

Amadon, Dean
Anable, Mrs. Anthony
Anthony, H. E.
Antopol, William
Aronson, Lester R.
Atz, James W.
Beach, Frank A.
Bogert, Charles M.
Boyden, Alan
Breder, C. M., Jr.
Brown, M. Vertner
Budinger, John M.
Carpenter, C. R.
Carter, T. Donald
Cazier, Mont A.
Charipper, H. A.
Clark, James L.
Clarke, L. Floyd
Clausen, Lucy
Coates, Christopher W.
Colbert, Edwin H.
Conant, Roger
Conway, William
Coolidge, Harold J.
Cousteau, Jacques-Yves
Cox, Richard T.
Crandall, Lee S.
Crane, Jocelyn
Curran, C. H.
Delacour, Jean
Dowling, Herndon G.
Elton, Charles
Emerson, Alfred E.
Enders, Robert K.
Fleming, Henry
Gandal, Charles P.
Gertsch, W. J.
Goodwin, George G.
Gorbman, Aubrey
Goss, Leonard J.
Gregory, William K.
Griffin, Donald R.
Haskins, Caryl P.
Hatt, Robert Torrens
Jakowska, Sophie
Kazimiroff, Theodore
LaMonte, Francesca R.
Lloyd, Hoyes
McClure, Gervase W.
Mayr, Ernst
Wallach, Jacques
Merriman, Daniel
Mettler, Fred A.
Murphy, Robert Cushman
Nachmansohn, David
Nigrelli, Ross F.
Oliver, James A.
Parr, Albert Eide
Peterson, Roger Tory
Ponder, Eric
Pope, Clifford H.
Riess, Bernard F.
Ripley, S. Dillon, 2nd
Schneirla, T. C.
Schroeder, Charles R.
Scott, J. Paul
Simon, James R.
Stunkard, Horace W.
Talbot, Lee M.
Van Gelder, Richard G.
Vogt, William

SUMMARY OF MEMBERSHIP

December 31, 1967

Benefactors	31
Founders in Perpetuity	15
Founders	21
Associate Founders	27
Patrons	63
Life Members	351
Supporting Members	227
Contributing Members	2,047
Annual Members	3,854
Fellows	71
Research Associates	3
Corresponding Members	3
Honorary Members	5
Total	6,718